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*Riter-Conley Manufacturing Company*

STEEL CONSTRUCTION

*Pittsburgh*



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# THE UNITED GAS IMPROVEMENT COMPANY,

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—•—

## BUILDERS OF

## THE STANDARD DOUBLE SUPERHEATER

## LOWE WATER GAS APPARATUS.

—•—

ACCURATE MEASUREMENT

OF

AIR AND STEAM SUPPLY

(PATENTED),

AFFORDING { PERFECT CONTROL OF GENERATOR FIRE CONDITIONS.

PRODUCING { UNIFORM RESULTS. HIGHEST EFFICIENCIES.

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## The Operation and Results of a Circularizing Department.

[Prepared by MR. J. P. HANLAN, for Mid-Year Conference, N. C. G. A.]

In these days of intensive effort and the use of high class advertising matter in our desire to hold and create business in old or new fields a circularizing department, properly organized and conducted, is an absolute necessity. For one reason, such a department compels systematic and intelligent endeavor, as in order to properly conduct it all the available prospects must be gathered together and followed up in a thorough systematic and timely manner. The old way of "just getting the business" in the natural order of things, so to speak, is giving way to the new way of adding profitable business at the time it is most desired by vigorously and intelligently going after it and making use of every agency that will help secure it. The writer gives way to no man in his high regard for the value of personal solicitation, but he also believes that since advertising is proving such a large factor in creating new markets for the use and sale of gas, a mistake is made if due advantage is not taken of the best methods for placing such advertising matter in the hands of possible customers. He also feels that a circularizing department offers a method of doing so in a most effective manner and at reasonable cost.

The Circularizing Department operated in the company with which the writer is associated has proved a valuable asset to the new business departments, and when consideration is given to the fact that in one suburban division embracing five districts, totaling 19,827 customers, one young woman is now doing the actual work of circularizing the prospects turned in by 11 representatives, it can be seen that the cost of conducting such department from a labor standpoint is but nominal. In this division 11,310 pieces of advertising matter were distributed in May, treating as follows:

| | | |
|---|---|---|
| Ranges | 2,780 | Of which— |
| Water heaters | 4,079 | 1,255 pieces were enclosed with receipted bills. |
| Gas irons and other domestic appliances | 1,821 | 437 placed in sundry sales packages. |
| Store lighting | 261 | 6,423 distributed by salesmen. |
| Welsbach lamps | 867 | 2,305 mailed to representatives' prospects. |
| Heating stoves—grates and logs | 293 | 890 taken by visitors to offices. |
| Fixtures—domes and reading lamps | 1,187 | |
| Factory advertising matter | 21 | |

In another division which includes two cities with 55,244 meters and has 18 representatives, one man does the work of the circularizing department. Approximately 70 per cent. of the population of one of these cities is foreign born. From March 1st to June 1st inclusive, there were 3,007 new prospects turned into the department and 7,882 pieces of advertising mailed to prospects, all of which were subsequently reported on by representatives, with 1,150 sales credited aggregating $20,296.00.

In another high class suburban district having 24,528 meters, one man does the circularizing work for 8 representatives. Up to date 2,468 pieces of advertising matter, 11,500 letters and 2,000 invitations have been mailed by this circularizing department.

The equipment of these circularizing departments consists of filing cabinets for prospects and a typewriter, although much of the advertising is addressed by hand. The method of operating circularizing departments in our company is briefly this:

The prospects are sent to the circularizing department each day by the district representatives, office sales force, collectors or others, and there filed, one set geographically and another set according to dates. Since the prospect card contains information relative to the particular appliance in which the prospect is interested, the circularizing department mails a piece of advertising matter immediately before filing the cards, and 3 days prior to the date which is noted for return call another piece of advertising matter is mailed to him. All matter mailed to prospect is noted on the prospect card, as a guide to the representative, and is then returned to him to make the call. In the event of his making a sale he marks on card what he sells and returns it to circularizing department, so that the card which is still in the geographical file may be marked and taken out of prospect file. In the event that sale is not accomplished notation is made, and if future date is given for subsequent call, other matter is mailed until prospect is either sold or finally abandoned. By always having a complete list of prospects in the geographical file an opportunity is offered for special effort in the way of announcements or other advertising matter which may not be included within the 2-day follow-up limit.

Here are are a few things we have learned in the operation of these

departments: It is of vital importance that the circularizing department have the cordial support and co-operation of the entire sales organization and particularly of the district representatives. In addition to co-operation it is necessary that the selling force and circularizing department co-ordinate.

The closer the personal touch that can be given the circularizing work the better the results will be. Anyone who can write a legible hand can address advertising matter, but a man or woman who appreciates the object of the circularizing work gets interested and often enthusiastic and interest and enthusiasm bring results.

The Circularizing Department should be part of the new business department, and preferably located in or as near as possible to the selling forces' quarters, so that they may know first hand what the selling force is doing and vice versa. Quality work counts in the Circularizing Department.

Three days prior to representative's return call is about right time to send advertising matter to get best results. Follow-up advertising is not worth much if not followed up. Therefore, send out follow-up letters in quantities that can be called upon within the 3-day period. Don't send out 1,000 pieces of follow-up advertising if the men can call on only 500. The other 500 are wasted effort and useless expense.

The Circularizing Department is an auxiliary selling service which is designed to and does supplement, but never was meant to, nor will supplant personal solicitation in the selling of gas or appliances.

You cannot judge results of circularizing department by the direct replies received by it.

Too much literature at one time is little better than none, as it defeats its purpose. Better one good letter than a letter too full of a variety of advertising matter. Judgment should be used in sending matter.

We have found it best to send range letters to the women; automatic and other water heater letters to the men of the families.

A letter or other piece of advertising matter which is mailed receives consideration when properly introduced, therefore, letters to women, or men, should be correctly and courteously addressed for instance:

Mrs. John Smith,
263 Central Ave.,
Jersey City, New Jersey.

and not—

Mrs. J. Smith,
263 Cent. Ave.,
J. C., N. J.

If it is worth while to spend the cost of postage and printed matter, some one should see that the one who addresses the matter does it properly. This is one reason why a boy should not be engaged to do circularizing work, as he is apt to have little interest in his work and quite often forgets to enclose the piece of matter referred to in a letter.

We have found that our best follow-up letters start off with something personal to the recipient. "You can save five dollars by using a Gas Water Heater," gets more attention than "We can save you five dollars by using our Gas Water Heater." This illustration is used to bring out the point that the greatest of care should be taken in preparing the follow-up letters used, as these letters are to pave the way for the men who are to follow them with a personal visit.

Care should be taken to see that the representatives are kept in close touch with the advertising matter and why it is desirable to use a piece referring to laundry work on Monday, if possible, etc.

They should be given only a reasonable amount of matter each day and care seen that they use it daily.

The circularizing department compels systematic canvassing of a territory and proper follow-up work.

The great difficulty of getting the selling force to appreciate the value of good advertising is overcome through the proper circularizing of it, as this brings results in dollars and cents to the sales force. This is usually an argument that needs no further explanation.

A circularizing department eliminates waste in advertising. In days gone by it was the usual thing in a gas office to find quantities of advertising matter tucked away in closets, or thrown on the rubbish heap to feed a bonfire afterwards. It was wrong then and it is downright sinful to do so now, when we have agencies at our disposal to place every piece of advertising in prospective customers' hands. It makes no difference whose advertising it is, the gas companys or the manufacturers—it all costs brains and money.

In conclusion I might add that we organized our first circularizing department about 3 years ago and found it to be of so much help that we now have these departments in operation in all six divisions of our company. We feel that they have been of assistance in enabling the selling force to sell 709 more ranges so far this year than during the corresponding period of last year, and 971 more water heaters, making this the best year of all with us.

I am indebted for much of the information contained in this paper to some of my friends and colleagues managing circularizing departments, and among others, Messrs. France, Zingg, Young, Ford, Curcin, Simonton and Potter.

## A Crude Oil Gas Producer.

By Nisbet Latta.

The State of California has been an active field for the utilization of crude oil as fuel, and the consequent decrease in the import of coal has left this section of the country dependent upon its natural resources of oil. The only competing sources of power are the hydro-electric developments.

In 1902, Mr. L. P. Lowe devised the first oil gas sets designed for the production of illuminating gas, and several were installed in the smaller cities of the State. The efficiencies from this original design were extremely low and operating difficulties were numerous; and oil-gas was not placed upon a practical commercial basis until the development by Mr. E. C. Jones, of San Francisco, of the Jones oil gas set, which is still the standard apparatus for the manufacture of illuminating gas upon the Pacific coast.

After several years of successful operation of the Jones type of apparatus, a number of small companies, influenced largely by the first cost of installation, installed a modification of that type known as the "single-shot" machine, containing the entire gas-manufacturing operation within a single shell, instead of in the double retort of the Jones apparatus. This type of gas-making machine, while maintaining a fair parity of efficiency, was cheaper in price and somewhat similar in operation to the double-shell machine.

This one-chamber apparatus brought the gas manufacturing industry another step towards the use of the oil producer for the manufacture of gas from crude oil, and goes to show that the development of the art was evolutionary rather than revolutionary in its nature, and that, commencing with the Lowe type of oil gas generators and ending with a power producer herein described, each step was progressive in its nature and logically brought about. This point should be emphasized, for the history of the development of an oil-producer gas shows that many efforts in the manufacture of producer gas from crude oil, especially those oils having an asphaltic base, have failed because of lack of comprehension upon the part of the inventor or designer of the characteristics of the fuel itself. Crude oil may be said to be, to a great extent, an emulsion of an infinite number of fractions, varying in both physical and chemical properties over a wide scale. The ebullition and distillation points of the fractions differ to an extraordinary extent, as will be seen from the following example:

Table I.—*Fractional Distillation of California Crude Petroleum.*—15.8° B. at 60° F.—Distillation begins 85° C.

| | Fraction. | | Color of Fraction. |
|---|---|---|---|
| No. 1—Below 150° C..... | 5 0 pr. ct. | 2½ pr. ct. water. | yellowish. |
| No. 2—150°—200°. ..... | 4.0 " | | yellow. |
| No. 3—200°—250°..... | 27.5 " | | lemon. |
| No. 4—250°—300°..... | 14.0 " | | lemon. |
| No. 5—Above 300°..... | 39.5 " | | red. |
| No. 6—Coke..... | 8.0 " | | black. |
| Loss..... | 2 0 " | | |
| | 100.0 | | |

Flash point, 257° F.
Fire Test, 293° F.

After the 300° fraction comes off the temperature rises immediately to above 380° C.

The ultimate analysis of oil from this same field is:

| | |
|---|---|
| Carbon..... | 85.0 per cent. |
| Nitrogen..... | 1.0 " |
| Sulphur ..... | 0.8 " |
| Oxygen ..... | 1.0 " |
| Hydrogen..... | 12.2 " |
| | 100.0 by weight. |

The constituents consist of the benzine, the illuminating, and the lubricating series of distillates, and the tars, pitch, asphalt and coke, or the paraffine residues. These have not only different distillations and flash points, but vary in their specific heats and other physical properties. It may be readily seen that in using an oil of so many various components, each given condition must necessarily differently affect each of the several fractions. These effects are most distinctly emphasized when referred to the extreme or antithetical components. For instance, we may imagine a quantity of crude oil entering a retort at given temperature and under specifically fixed conditions. It will be at once patent that these conditions would reflect certain phenomena reacting upon the asphaltic base or coke of the oil, and totally different influences upon the benzine, gasolene or kerosene series of what may be termed the "upper scale" of crude oil analyses. The difficulty with which designers have labored has been that if sufficient heat was applied to the oil to break down or gasify the heavier tar fractions, or even the lubricating series, such conditions or temepratures would be destructive of the lighter fractions; the hydrogen content being suddenly liberated, or "flashed," and the carbon precipitated. These fractions are what are technically known as "fried," and the result is the formation of lamp-black or some similar carbon substance, impractical of reconversion into a potential gas; an uneconomical reaction by reason of its high exothermic loss, and extremely prejudicial to gas engine regulation.

If the above statements are clear, it is evident that the problem, which has until the last two years proved a stumbling block in the manufacture of producer oil-gas, has been to convert crude oil into a potential gas, having a minimum of impurities, and either to extract all such impurities or to convert them into a form productive of useful work. In other words, the problem was that of oxidizing equally the various fractions of which crude oil is composed, and reducing it to some homogeneous form (let us say "common denominator") whereby a uniformity of oxidization will occur without prejudice to either extreme in the scale of elements of which it is composed. To explain just how this is accomplished, it is perhaps best to describe the apparatus with which it is now being commercially performed.

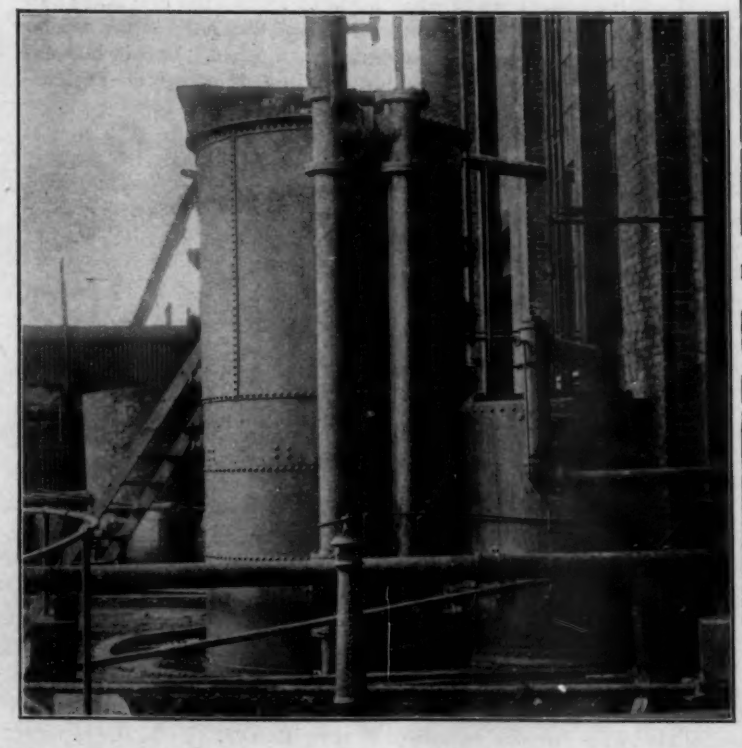

Fig. 1.—500-Horse Power Oil Producer.

The plant comprises a firebrick-lined cylindrical shell, having an oil and steam injector and an orifice for the admission of air; also a coke bed superimposed upon a firebrick grate. These few and simple elements constitute the entire apparatus. Either the engine or a suitable exhauster is utilized to withdraw the gas from the producer, and to introduce the air.

The producer having been brought to a gas-making temperature by the admission of sufficient air for complete combustion of the fuel, the supply of air is so reduced in proportion to the oil admitted, as to permit only partial oxidation, or a theoretical reaction of C to CO. There is nothing novel or unique in the partial oxidation of oil by an insufficiency of air; such an arrangement comprehending the use of a misting spray, such as the one with which this producer is equipped, would not obviate those difficulties which have been heretofore described. It is evident that for physical reasons or conditions of mass action, it is necessary to finely divide the oil, which is done mechanically at its admission, either together with, or separately in the presence of steam, through a nozzle of proper design which will be later described.

No matter how small the oil globule may be, each individual particle. corpuscle or atom, however minute, contains all of the varied and dissimilar elements or fractions of "the oil scale" and it is manifest that some additional factor in the conversion of the latter, must be introduced in order to promote efficiency in its conversion to a potential gas. This is accomplished in the following manner; and at this point we arrive at those conditions of novelty upon which the high efficiency of this apparatus depends.

Not only is the oil admitted in a mist, or finely divided spray (thoroughly segregated into minute particles), but this spray is enveloped or enclosed in a capsule of steam, the steam being admitted around the oil plume in such a way as to temporarily coat it, and shield it from immediate contact with the incoming air, hence preventing selective or superficial oxidation, by a delay or retardation. This capsule or steam envelope acts as a retardant, permitting an interval of time, before it is penetrated, by the air, within which time the fine particles of the oil spray are subjected to the disruptive action of the heat within the producer; for, not only are the oil particles expanded by the action of the heat, and their molecules thereby rendered more susceptible to combination with oxygen, but by reason of the different specific heats of hydrogen and carbon, a disruptive effect takes place which tends to separate the fractions from each other, and also to break down each particular fraction, especially the more obstinate and heavier compounds, into a state more purely elemental.[1] As the steam envelope is punctured, oxidization goes on with greater uniformity, as the result of both physical and chemical atomization, thereby making a very stable gas, with an extremely small amount of uncombined or mechanical matter; this being due to the high efficiency in combination. Briefly, the oil is atomized by the spray and "cracked" by the action of the heat; the dual phenomena permitting a very uniform and efficient condition of exidation; the latter performance being permitted and made possible only by the retardant influence of the steam envelope within which the oil is admitted to the producer.

The steam capsules perform one other function in the operation of the producer, perhaps not less important than that already described. It will be seen that the oil nozzle enters a circular retort and projects the oil therein in a spray or plume, which, although occupying the center of the retort, must of necessity leave large voids or channels near the point of its entry where the spray, by reason of its velocity, has been unable to expand along the walls on either side of its axis. Should this oil plume be immediately oxidized by the incoming air two phenomena would occur. First, a surface or peripheral combustion would take place due to the combination of the incoming air with the surface of the oil spray. This would burn with an intense heat, coking or turning to lamp black the core or center of the oil plume, which would be carbonized before the incoming air reached it. A condition of this sort accounts for the necessary use of high air excess in the firing of oil in furnaces or beneath boilers. The second action that would occur is that large portions of the air would follow the channels or voids between the plume or spray and the walls of the producer, by-passing the spray, and either combining with the gas in the bottom of the producer and completing combustion there, or in case of conjunction with the gas at a temperature below the ignition point, escaping from the producer uncombined.

However, the insulation of the spray or plume by the steam allows the time necessary for this spray to expand by the action of the heat so that it completely fills the cross section of the producer, creating a nebula of steam and oil, downward through which the air is drawn, giving a finely distributed oxidation, and preventing by-passing or channeling by the air. The result is a non-luminous combustion or rather semi-combustion, very similar in appearance to the vaporous oxidation occurring in the combustion of alcohol.

The reaction above described is the most important of the various forms occurring within the producer. There is, however, a second-

1. You have also an intimate physical contact of steam and hydrocarbon, making possible at each globule a splitting of water into free hydrogen and oxygen joined to surplus carbon of the hydrocarbon as carbon monoxide—water gas producer action.—(Fitch.)

ary action which by reason of its simplicity and efficiency is worthy of careful attention. No matter how theoretically complete the phenomena herebefore described may be, in practical service and at varying loads it is evident that there must be some uncombined material which by reason of varying conditions and temperatures, takes the forms of coke, lamp black or other carbonaceous material and is carried downward in mechanical suspension or entrainment by the effluent gas. To extract this, a coke filter-bed, 18″ in depth, is placed upon a grate or grid. This bed has been called a "fuel bed," but as a matter of fact, its functions are those of a filter. By reason of the temperature within the producer the coke of the filter bed is made incandescent, and the carbonaceous deposits acquired by the filteration are superimposed thereupon. Whether or not there is any catalytic influence bythe coke upon this carbonaceous material is beyond the province of this paper to state, although it is the opinion of the writer that such is possibly the case. Of one thing there is no doubt, this superimposed carbonaceous deposit acts as a chemical reservoir, or regulator, and when, by reason of changing conditions, the gas from the combustion zone becomes leaner, (that is to say, higher in carbon dioxide) this carbonaceous deposit is combined into a potential gas by the reaction, $CO_2$ plus C equals 2CO. In practical operation, this action is constantly occurring, the plus and minus variations of CO and $CO_2$ in the primary gas being compensated by the C picked up from the top of the filter bed; the quantity of deposit and recovery maintaining an equilibrium. In this way the filter bed never attains a high degree of either accretion or depletion, but remains at constant depth, and free from stoppage, packing or plugging. In proof of this 28 months operation of a plant, shows the total coke supply for the filter, including losses during stand by of apparatus to be 1/80 pound per brake horse power hour. Even this almost negligible amount can, in the opinion of the writer, be reduced.

The result of this filtering and the secondary reactions upon the carbonaceous deposits is promotive of fuel economy, through conservation of all by-products, and is satisfactory in its cleaning action. The effluent gas is quite clean, requiring but little washing (principally necessary for the reduction of the gas to standard temperature) before admission to the engine. The total impurity in the finished gas has not been closely determined, but filtration of the scrubbing water for 24 hours showed an accumulation in the case of a 100-horse power plant of less than 1 cubic foot of lamp-black; and the valves, combustion chamber, cylinders, etc., of the engine, after months of continuous operation, have never shown any deposits.

It is possible that the capulizing of the oil spray has an effect, in addition to those described, namely a graduation of molecular readjustment. This curious action is observed inversely in the instance of cooling illuminating gases, as in the condensers and scrubbers of water gas apparatus. Under such conditions, it has been found advisable to cool or condense the gas at a moderate or graduated rate of speed; sudden variations in temperature tending to "shock the gas," and causing it to precipitate some of its valuable ingredients. Water gas is "fixed" and later condensed and cooled at gradually descending temperatures in order to prevent an undue loss of illuminants by any sudden change of temperature. The gradual readjustment and expansion of the oil molecules, or of the various "fractions" of which the oil is composed is doubtless somewhat analogous to this phenomenon, and may add an important element to that of the disruptive action, or "cracking" caused by the heat of the combustion chamber. One of the most interesting features of these reactions is illustrated by the analysis of the gas manufactured in this apparatus, an average of over 1,000 samples being given in the following table:

| $CO_2$ | $O_2$ | $C_nH_{2n}$ | CO | $CH_4$ | $H_2$ | $N_2$ | B.T.U. |
|---|---|---|---|---|---|---|---|
| 6.2 | 0.3 | 1.0 | 15.1 | 5.4 | 4.6 | 67.4 | 143 0 |

The most significant thing in this analysis is the extremely low hydrogen content, considering the quantity of steam used for injecting the oil and in the forming of the aqueous capsule or envelope about the oil plume. This low hydrogen, indicates a gas of very high engine efficiency inasmuch as the gas is of great low heat value as compared with other producer gases made either from oil or coal The reason for the small amount of hydrogen is obvious, viz.: the temperatures maintained within the producer as referred to general practice are extremely low. So low, in fact, as to prevent any considerable combination between the steam and the carbon, or the dis association of the steam in the presence of the carbon; which reaction requires a reasonably high temperature. In other words, the steam passes through and from the producer undissociated, in the form of an aqueous vapor, and is condensed in the scrubber. In its travel it acts as a diluent and endothermic agent, regulating the temperature of the producer, and maintaining the conditions of gasification in automatic equilibrium, the proportion of steam increasing or diminishing in co-ordination with the number of heat units liberated by the oil. The extreme uniformity of this gas as shown by a comparison of several thousand analyses, and a study of its average analysis given in the table, constitutes probably the most vital feature of this process. Theory and performance balance, and mutually verify, inasmuch as the theoretical reasoning and conditions of actual test, prove an efficiency of about 85 per cent. There are for all practical purposes, but two sources of heat loss in the operation of the cycle, viz.: the loss by radiation or "skin loss" of the producer shell; and the sensible heat of the effluent gases. These combined losses, according to the experiments of Euchene, should aggregate about 15 per cent. of the initial heat value of the fuel; or a total conversion loss between the initial fuel and the finished gas of 15 per cent. Conversely a working efficiency of 85 per cent. These figures are borne out by actual commercial performance in daily practice.

One of the most interesting things in the operation of the producer is to observe through the sight cocks the combustion, or properly speaking, the process of oxidation occurring. This oxidation occurs, not as in most operations of this kind, in the manner of a flame or flame plume, but has the appearance of a light vaporous haze, not unlike the flame from an alcohol lamp; being practically nonluminous, apparently not emitting any light waves, such illumination as is attained being evidently the reflected light or heat waves from the linings of the apparatus. The inner walls are in this way visible, appearing a dull cherry red, or somewhat under an orange heat. Under conditions of proper operations, there are no flashes or flames whatever from the oil spray.

The sprays used for injecting the oil into the producer and its disruption or mechanical atomization, are of various types, similar to those used in ordinary boiler firing, wherein the oil is injected by a current of steam. It has been found that oil is most completely atomized or mechanically misted by a two stage process, the larger globules being broken up in what might be termed the first stage and the resultant atoms disrupted into an impalpable mist in the second stage, or passage through a secondary spray nozzle. This is best explained by referring to Fig 2, where within a pump cylinder or casing there is a piston *G*.

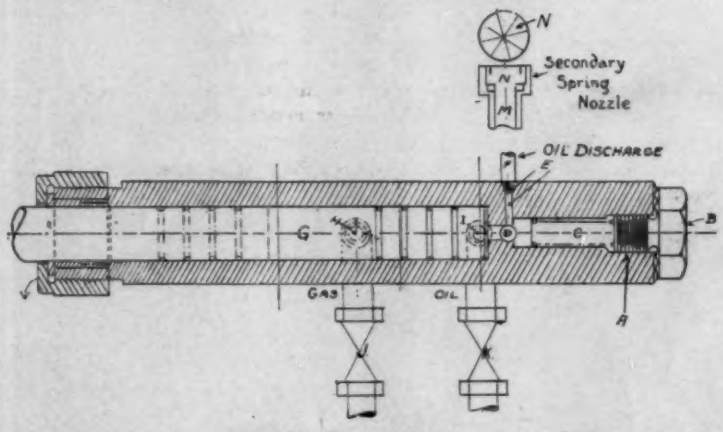


**Fig. 2.—Two-Stage Atomizer.**

By the movement of the piston from right to left the port *I* is uncovered, drawing into the pump a portion of oil, preferably through a sight feed. As the piston further recedes a second port *H* is uncovered, breaking the vacuum upon the oil supply at *I*, and permitting the admission or drawing in of gas, air or steam which fills the space left by the further recession of the piston *G*. Upon the return or compression stroke of the piston (the admission ports being closed by check valves) there is between the head of the piston and the oil contained, a plug of compressed gas, air or steam, tending to press forward the oil and forcing it against the ball check valve *D*. This check valve is held upon its seat by a spring *A*, at a tension of from 150 to 200 pounds (depending upon the gravity of the oil to be sprayed) the returning piston pressing upon the intermediate gas until it attains a pressure equal to overbalancing the spring, which slowly allows the escape, through the valve *D*, of the now pulverized oil, and the compressed gas through the port *F*. The reducing coupling now permits the oil gas charge to expand into a secondary spray

nozzle of slightly larger diameter in order to reduce the velocity of efflux, the oil being sprayed through a slotted or drilled nozzle, *N*. At this stage of the operation there occurs an action almost identical with that of the Corliss engine, wherein the steam continues to expand and drives forward the piston, even after the period of valve "cut off." So in like manner, after the closing of the check valve *D* by the spring *A*, the compressed gas continues to expand and drive the oil forward with tremendous force through the spray. This dual operation disrupts the oil into a finely divided spray, better described as an impalpable mist, which is so fine in fact that it will flow upward in the atmosphere; a photograph of such a spray burning under atmospheric conditions being shown in Fig. 3. No other

**Fig. 3.**—Oil Mist Burning in the Atmosphere, the Mist so Fine as to Flow Upwards in the Air, as Indicated by the Flame.

method examined by the writer has ever so completely dissociated or finely divided a heavy oil, and oils down as low as 9° Baume have been successfully handled, the one requirement being slightly heavier spring pressure and an increased amount of the complimental steam, gas or oil.

The steam necessary for this process is admitted at about 30 pounds pressure; the oil being admitted at like pressure; the steam generated in a waste heat boiler, utilizing the sensible heat of the outgoing gas.

The question of the nature of the carbonaceous deposit and also of the analysis of the oil itself, as affecting the operation of the apparatus, must arise. But, curious to state, although our country produces the widest possible range of coals, extending from peat to the higher grades of anthracite, and varying to an extraordinary degree in the nature of their various elements, crude petroleum is practically uniform in its *ultimate* analysis, there being not 2 per cent. variation in any oil, from any field, save possibly a difference in sulphur content.

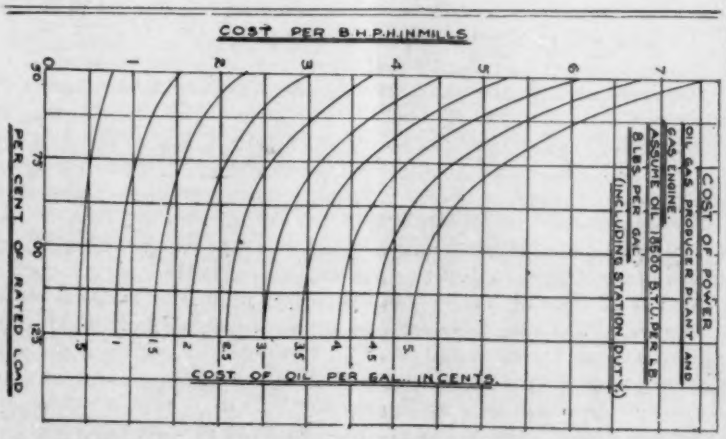
COST PER B.H.P. IN MILLS
PER CENT OF RATED LOAD
COST OF OIL PER GAL. IN CENTS.
COST OF POWER
OIL GAS PRODUCER PLANT AND
GAS ENGINE.
ASSUME OIL 18500 B.T.U. PER LB.
8 LBS. PER GAL.
(INCLUDING STATION OUTPUT)

**Fig. 4.**

By way of recapitulation the problem of the oil gas producer embraced certain propositions to be solved, viz.:

1. How to prevent the formation in a producer, of excessive quantities of lampblack or coke.

2. How to take care of, extract, convert and conserve the lampblack or coke made; *i. e.*, to secure its gasification and transmute a deleterious by-product into a potential gas, and useful form.

3. How to take care of fluctuation in fuel supply subtended by various engine demands.

4. How to secure practically, directly and commercially, uniform conditions of oil gasification within a producer of simple construction; and a gas of uniform quality in immediate and competent supply through a widely varying and rapidly changing demand.

All of these conditions have been met in the apparatus herein described.

## Construction and Operation of a Modern Gas Plant in a Small Town.

[Prepared by Mr. C. M. Crawford, for Southern Gas Association.]

I will discuss the subject assigned me from the viewpoint of I, the place; II, the time or season; III, the money outlay; and will then describe the construction and operation of the plant at High Point, N. C.

To build a modern and profitable gas plant, we must first find the right town and the proper location in it. The town need not be of people who are all worth thousands or millions of dollars, and have their servants to keep coal stove red and to see that they are supplied with hot water at all times. Neither do we want people who spend their lives in a mill at small wages and who never aspire to the comforts and conveniences of modern life. The town should best comprise people who appreciate home comforts, but who are not able to have a train of servants at command, and who want modern conveniences for their personal use.

I give in the next paragraph those points which, in my opinion, have the most bearing on the problem of a modern gas plant in a Southern town where the population is made up of such as above described, and numbering around ten thousand. It is not my opinion that a gas plant can be made a success in every town of ten thousand; you realize that every town must be studied most carefully before that can be determined.

*Location of Plant.*—The gas plant should be located as near the centre of distribution as possible. It should also be on the railroad and below the siding level so coal, coke and oil may be unloaded by gravity.

*Time to Build a Gas Plant.*—The time to build is in the early spring. The material should be placed on the ground in February, and all departments organized so as to begin work on March 1st. This will give 2 months in which to erect the plant and to lay from 8 to 10 miles of mains by May 1st. With two or three live solicitors to take contracts for gas appliances ahead of the laying of mains, there should be, at least, 300 consumers connected by that date. There should also be a display room opened during this time to give an opportunity to prospective consumers to look over the gas appliances and make selections. An expert should give a demonstration sometime during the month of March, using tanks of compressed gas, the pressure on appliances controlled by a regulator. This shows the people just what can be done with gas appliances and gives them an idea of what to buy.

It is best to sell and connect gas appliances during construction, because construction work is the best possible method of advertising. Every line of a city's business and domestic life is quickened by the construction payroll, and the many forces which naturally accompany such work. The mains and services can be better tested, and laid cheaper when both are done at the same time. If appliances are connected and ready for use by May 1st, the company not only has 300 consumers. but 300 boosters who will bring more consumers if handled properly, and kept satisfied.

It is best to turn gas on town in May, because the consumer has all the long summer months to realize the convenience of the gas range; the company has the summer months to secure consumers and train them how to use the gas economically; and the consumers who are secured for illumination, get their first gas bills as the lighting hours are decreasing. This satisfies the consumer and gains others.

*Money.*—The most essential factor when a company begins the construction of a plant is the money investment. Many companies build gas plants, small plants especially, on a cheap scale. They lay mains of about half the proper size, leave out valves, expansion joints, drip pots, corporation cocks, curb cocks, strainers, and lots of other things that go to make up a modern and successful plant. It is as essential that we have all these conveniences in a small plant as in a larger one.

Which is the most practical system of distribution should not be

decided by consideration of cost entirely. The system selected should depend largely upon the town and near by prospective gas towns. If the town is scattered and has suburban settlements, high pressure distribution seems most practical; but if the town be compact and no near-by towns that may reached, a low pressure distribution appeals to me as the best, because I never have known a gas regulator to deliver gas to the consumer as steadily and at as even pressure, as can be delivered by low pressure distribution with mains and services of proper size. One of the most essential things in either high or low pressure distribution is to have all mains and services of ample size; with laterals so connected as to leave as few dead ends as possible, in order to insure equal pressure over the entire system.

*The Plant at High Point, N. C.*—Most of the foregoing ideas were employed in the construction of the gas plant at High Point, and its operation in our mind substantiates the theories.

In the beginning of 1912 the North Carolina Public Service Company decided to erect in High Point a water gas plant with high pressure distribution. It was planned that it should be completed and gas turned on about May 1st, 1912, but by several unforeseen causes the start was delayed until July. In order to get all the advertising possible from the construction work, the excavating for building and the trenching for mains was begun, and the display room opened on July 10th. A demonstration of one week was advertised beginning July 15th, given by an expert demonstrator, using compressed gas, shipped in tanks from the company's plant in Salisbury, N. C. The demonstration given before the completion of the plant brought about great enthusiasm over the city, and was in every respect a decided success. During this week of demonstration, more than 200 contracts were taken for stoves and water heaters, and getting these contracts so early enabled the construction work to be carried on more systematically.

The mains and services were laid by blocks and tested under 100 pounds air pressure. All joints and connections were thoroughly inspected, and the connecting of regulators, meters, ranges and water heaters was done at the same time. By carrying on the work in this way, enthusiasm was created causing the people to talk gas that could not have been effected in any other way. By this method the construction work was carried on street by street until there was about eight miles of mains laid, and 300 consumers connected. All mains were 2 and 3 inches, and all services ¾ inch. This was done in order to standardize all fittings and connections. The mains were laid 5 feet from curb and 3 feet under ground, and provided with valves, drip pots at low points, and expansion joints every 500 feet. The services had corporation cocks, curb cocks and strainers, all of which are necessary in high pressure distribution, and all the mains and services were carefully graded. The drip-pots were placed in the mains for two purposes; to collect condensation that might form, and to catch the scale that often gives trouble in the mains or services within a few years. Valves are placed at every block and branch line so as to be able to cut out any block or section in case of leaks, or other trouble in mains or services. A corporation cock and curb were placed in each service, and a strainer in front of every individual regulator. This strainer catches all scale and trash that might accumulate and cause trouble in the regulators.

As before stated, we began work on the plant July 10th, and by Sept. 10th the plant was completed, mains and services laid, about 300 consumers connected and gas turned on the city; showing that in 2 months a small modern gas plant can be erected.

The principal feature of the erection of this plant, was the location of the buildings, gas apparatus and machinery. The works was designed so that it might be operated by one man, which is being done very successfully. The duties of this man are to make gas from 5 to 6 hours a day, making about 8,000 cubic feet of gas per hour. This leaves 4 hours for cleaning gas machine, boiler and machinery, and 2 hours to spend on the purifying material and storeroom. In building it we put forth every effort to eliminate all petty troubles and to make everything around the plant as convenient as possible. We put the tar well at the lowest point so that all tar from drip pots, exhaust steam and other drainage might run into the well by gravity. The yard level about 14 feet below the railroad track. The building nearest the railroad track is the gas plant. The tank nearest this building is the compression tank of 15,000 cubic feet capacity. The other is the oil tank of 16,000 gallons capacity. The gas holder has a capacity of 50,000 cubic feet. The building near the holder is a cottage for the use of the works' operator; the building beyond is the stable and storeroom.

Having the operator live on the works enables him to take care of the pressures at night, and to exercise general supervision over the company's property. His cottage is equipped with a telephone and an electric alarm bell which is so connected that when the pressure falls to 6 pounds it rings and continues to ring until the operator raises the pressure. I figure that this cottage on the company's property, cost practically $800, saves the company in the hire of labor alone $550 a year, more than 65 per cent. on money invested; or the saving would pay 6 per cent. interest on $9,000. This shows how any company contemplating the erection of a small plant may save thousands of dollars by wisely spending a few hundred.

In the generating room is a 4 foot water gas set, the apparatus so fitted up as to make it as convenient as possible for the operator. The operator, standing by the generator with his hand on the steam valve can see at a glance his steam gauge, oil pumps, oil meter, oil pressure gauge, pressure board, pyrometer and test light. He need step but a few feet and see the station meter, and check each run. This machine uses 5 gallons of oil per run, making 1,500 cubic feet of gas, or 3.33 gallons of oil per 1,000 cubic feet, and there is approximately 35 pounds of coke used per 1,000 cubic feet of gas made. The fan for blast purposes is electrically driven, the starting box being placed near the superheater, so that the operator can start the motor with left hand, while opening stack valve with right hand. This saves time, which is very necessary in one man operation. The gas from this machine passes through the condensers into two out door purifying boxs, 12 feet in diameter by 5 feet deep; thence through station meter into storage holder. It is then drawn from the holder by a Westinghouse steam driven compressor, which works automatically and keeps the pressure at 15 pounds. If there is no steam, an electrically driven reserve compressor is used. The boiler, which has a capacity of 40-horse power, is connected with feed pump, and an ejector which is connected in a basin placed in the concrete floor. All drains from steam traps empty into this basin.

One might form the opinion that to operate this plant with only one man would require an operator above the average in intelligence and ability, but this is not necessarily the case. Our operator is a negro man, about 45 years of age, who, prior to entering our employ, had had no experience in this line of work, other than being a stoker for a coal gas plant. He received for his services, house rent, lights and $1.50 per day. I do not wish to leave the impression that this is an absolutely perfect plant. It is not possible to build without later finding some points that could be improved upon in some respects. There are points of construction upon which a great many gas enneers disagree, and upon all points we stand ready to take suggestions and give information.

## Geological Survey Report on Lassen Peak Eruption.

In a report just forwarded to Washington from the field, Geologist J. S. Diller, says: "Mount Rainier and Mount Shasta, the beautiful cones so much in evidence to the traveler on the Pacific Coast north of San Francisco, are now finding an up to-date rival in Lassen Peak, which is plainly in view from the railroad for many miles in the Sacramento Valley between Redding and Red Bluff. Lassen Peak is the southern end of the Cascade Range, and it stands between the Sierra Nevada on the southeast and the Klamath Mountains on the northwest. Its lavas erupted in past ages reach the Sacramento Valley on the one side and on the other form a part of the vast volcanic field, one of the greatest in the world that stretches far across California, Oregon, Washington and Idaho to the Yellowstone National Park. Of all portions of the Cascade Range, Lassen Peak still retains the largest remnant of its once vigorous volcanic energy. Morgan and Suppan Hot Springs and Bumpass Hell on the south as well as Hot Spring Valley and the boiling mud-lake Tartarus on the southeast have long attracted the attention not only of Californians but to some extent of the tourists, to whom the region is growing more accessible every year. But what is the nature of this new activity of Lassen? Is it really volcanic? Will it soon dwindle and become wholly quiescent or on the other hand is it the precursor of a more profound eruption? The excellent photographs that have been taken of the outburst from a point 6 miles northwest of Lassen Peak, leave little doubt in the mind of any one familiar with volcanic phenomena that the out burst is essentially volcanic. These photographs are strikingly similar to those taken by Johnston-Lavis, showing the progress of an eruption in the Lipari Islands, whose volcanic character is well known."

The eruptions of Lassen Peak began May 30 at 5:30 P.M., with an

outburst of steam which continued about 10 minutes. It formed a crater in the snow-covered summit about 25 by 40 feet in extent and covered the encircling snow for a distance of 300 feet with a mantle of dark wet dust. On the following day at 8 A.M., another eruption occurred, and on June 8, the third and much larger outbreak took place lasting 30 minutes, and a rolling column of dense black smoke rose to the height of 2,500 feet. Stones were hurled from the crater and the Forest Service outlook house, a quarter of a mile away on the tip top of Lassen Peak, was struck by some of them. Blocks and smaller fragments accumulated about the crater to a depth of several feet. The dust and sulphurous gases carried southward by the wind were observed at Mineral, the forestry station, and the dust was noted 5 miles beyond. Forest rangers who were in the neighborhood during the eruption, heard the rushing steam and the falling rocks but report no rumbling or subterranean noises, earth shocks, electrical phenomena or great heat beyond that of steam. The dust was practically cold when it fell. Considerable volumes of water were ejected probably wholly in the form of steam. The water condensing from this steam washed a gully in the snow to the adjacent lakelet which occupies what prior to this latest eruption had long been regarded as the youngest crater of the Lassen volcano. The new crater is not quite over the throat of the old but is a few hundred feet to the northwestward. In all there have been eleven eruptions up to the date of this report – June 21. The most violent was at 9 A.M., June 14, when several overventuresome persons were injured by falling or rolling stones. The eruption was visible from the Sacramento Valley nearly 40 miles away, and created profound interest. The last eruption was Friday, June 19, and of relatively small energy. Mr. Rushing reports that eruptions are generally if not always precededed by a complete cessation of escaping steam.

With successive eruptions the new crater is enlarging. June 20, when I visited it, it was 400 feet long and 100 feet wide with a depth of not over 100 feet. It appears to follow a fissure running a little north of east and south of west. The escaping steam from the southwest end of the fissure is visible in the excellent photograph obtained by Mr. Loomis. The other hot holes about Lassen Peak, as far as I can learn, have not increased their activity unless it is Bumpass Hell which is always fuming; but nothing like an eruption has been reported. No definite molten products have been found in connection with the recent eruptions. The ejected dust, as far as can be judged from an examination with a pocket lens, is disintegrated or pulveized dacite, perhaps in part decomposed. The quartz and apparently also the glassy feldspar are bright but the hornblende, augite and mica are of course not so abundant in the dacite and are less evident. An examination with a petrographic microscope confirms the conclusion that the dust is the product of the pulverizing action of the explosive gases on the rocks through which they are escaping, and not the result of the explosive expansion of gases in a liquid lava.

That heat has recently risen in the core of Lassen Peak is evident from the fact that whereas it was once cold now it is hot and steaming. When I was on the mountain in July, 1883, and slid down the 2,000-foot snow bank into Hat Creek there was no sign of heat in the summit. The rocky summit of the peak, struck by many thunderbolts during storms and superficially fused here and there by the lightning to fulgerite, is still as it was then and the little lake is there as in 1883; but the heat and the crater are new. Mr. Rushing tells me that these new features appeared with the first eruption. But the fact that the other hot places about the mountain are not yet perceptibly hotter indicates that the rise of temperature is local and does not as yet affect the mountain mass. Time alone can tell what Lassen is going to do. The volcano may subside to its former quiescence. But we must not forget that it was only the top of the old Vesuvius that was blown off to make Monte Somma and the Vesuvius of to-day. Krakatoa blew up from the very base with tremendous effect. There seems no good reason at present to fear a Krakatoan outbreak at Lassen Peak, but the part of wisdom dictates a close watch.

## An Intensive Water Heater Campaign.

[Prepared by MR. R. O. JASPERSON, for the Wisconsin Gas Association.]

The value of the gas water heater as a revenue producer for the gas company is worthy of the most thoughtful consideration. There are several reasons why this is true, and if it can be shown that the water heater is not only a means of producing more revenue but a means of more firmly entrenching gas as a household necessity, study of the question will be time well spent.

The value to a gas company of any appliance depend upon the following points. Will it tend to hold business already created? Will it create new business? Will it make satisfied customers and thus serve to make gas as necessary to existence as food and clothing? In examining the possibilities of the gas water heater from the above standpoints it must be admitted that it presents a number of attractive features for consideration, both as a means of increasing revenues by increasing the send out, and as a means of planting more deeply the thought that gas is among the most useful agencies for promoting human welfare and happiness. The modern gas lamp is an example of a gas appliance which is of great value in holding business already created. If it were not for the developments in the field of illumination by gas it might not now be true that gas is holding its own as a means of illumination despite the progress that has been made in other fields. It is a means of holding lighting business, but the increase in send out of gas is all out of proportion to the number of lamps being sold. The improved burner, by reason of its greater economy and efficiency, has, theoretically, reduced the consumption of gas, though it is perhaps true that there is actually no reduction because the better and cheaper light rather encourages the use of gas and the total amount consumed is no less than formerly. The fact remains, however, that the selling of improved lighting appliances does not materially increase send out. The gas range business too presents features that cannot be ignored. A large proportion of ranges sold to day replace worn out equipment sold 10 or 15 years ago. New and more attractive types are taking the places of the old standard ranges, and, while there is a steady increase in the number of people who discard the old fashioned cook stove for the gas range, which means new business and more send out at the plant, it cannot be denied that the majority of ranges sold are merely replacing others. The gas water heater business, on the other hand, is still sufficiently young to make it safe to say that, whereas a fraction of the water heaters sold are going into places where there have been no gas water heaters.

Gas water heaters have been on the market for years it is true, and many hundreds are used in nearly every community. The heater is an appliance that certainly fills a need and in time it should become as common as the gas range is to-day. For some years however, and until the number of heaters is up to the number of gas ranges, practically every heater sold means more gas sales, just as the ranges sold 10, 15 and 20 years ago meant new business. This being true we are warranted in devoting much thought to the best means of selling water heaters. The business is bound to increase. The higher the social scale the greater the demand for hot water. One of the refinements of civilization is the bath. The higher the civilization the more demand for hot water and the gas water heater is certain to be in constantly increasing demand as the community advances in culture and prosperity.

A campaign for the sale of water heaters presents certain problems, which, when solved, result in simplifying the final closing of a sale. Especially is this true of the work of selling automatic heaters, because of the larger investment and the necessity for good salesmanship to dispose of them. A fundamental requirement is a list of prospects. How to get such a list is one of the first problems. In preparing for a campaign, which is of necessity limited to a few weeks in the spring and fall, one must focus his efforts upon those prospects considered most receptive. This means a process of elimination. After eliminating the present owners of water heaters, people who live in apartment houses where hot water is supplied by the owner, may also be dropped from the list. People who live in rented houses as a rule are not first class prospects for automatic heaters, because, for the most part, they move frequently and the cost of connecting and disconnecting and moving the automatic heater is an obstacle. The renter should be made acquainted with the advantages of the automatic heater, however, because when he does buy his own home he will be a prospect for an automatic. Meantime sell him a circulating heater if you can. Another class which may be eliminated in an intensive campaign is the owner of the large home, in which there is a circulating system supplied by a coal heater attended to by servants. The best prospects are the owners of homes, neither too large nor too small in which there are few servants, and in which the comfort and convenience of an automatic gas water heater will be thoroughly appreciated. How to locate such prospects is a problem which when solved will greatly lighten the labor of a campaign.

The most satisfactory method of preparing a mailing list is to get a "blue book" list of names and in conference with someone thoroughly acquainted with the city, eliminate those that are known to be "no prospect." It is possible usually by reference to records in every gas company's office to eliminate those who already have auto-

(Continued on page 26.)

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NOTICE TO ADVERTISERS.

New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, JULY 13, 1914.

[Official Notice.]

## Michigan Gas Association Meeting.

Office of the Secretary-Treasurer,
Grand Rapids, Mich., June 29, 1914.

The annual meeting of the Michigan Gas Association will be held at Lake Harbor, Wednesday, Thursday and Friday, September 2, 3 and 4. This decision has just been made by the Executive Committee of the Association and we are sure those attending the meeting will find this departure from the regular practice of holding gas association meetings in the large cities, a most delightful experience.

Lake Harbor is a resort beautifully located on Lake Michigan and an inland lake 4 miles south of Muskegon, Mich. It is reached by Goodrich Boat Line via Muskegon, and by the Grand Rapids and Indiana Railway, and the Grand Rapids-Muskegon Electric Road via Grand Rapids. The hotel accommodates 500 guests, is prettily located and gives excellent service. There is a fine 18 hole golf course, baseball grounds, 9 tennis courts, Lake Michigan bathing beach, fine bath houses, bowling alley, billiards, canoeing and good automobile roads. There is a combination theater and convention hall which may be used for dancing parties as well as for the business sessions of the convention.

There are a number of cottages in connection with the hotel, and it is hoped that members will bring their wives and children, for the resort specially caters to the whole family.

At the time chosen, the association will have the resort practically to itself, and there is enough to do aside from a carefully planned business programme, which will be announced later, to make the trip worth while to any gas man within reachable distance of Michigan. Every gas man is invited to meet with us whether a member of the association or not. The hotel rates are on the American plan ranging from $3 a day without bath, to $4 and $5 a day with bath; and will for this occasion cover the use of the golf course, tennis courts and other features for which there is usually an additional charge.

Glenn R. Chamberlain, Secy. Treas.

[Official Notice.]

## Pacific Coast Gas Association.

Office of the Secretary,
445 Sutter Street,
San Francisco, Cal., June 25, 1914.

To the members of the Pacific Coast Gas Association: As the date of our 22nd Annual convention is rapidly approaching, this is to advise that our President, Mr. Champ S. Vance, of Los Angeles, Cal., is leaving no stone unturned to make the Convention a success in every particular.

The papers which are being prepared for presentation before this meeting will all be strictly up-to-the-minute. Our wrinkle editor, Mr. H. W. Burkhart, promises to eclipse all previous efforts so far as his department is concerned, and our experienced editor, Mr. John Clements, will relate to you many strange things experienced during the past year. The Gas Exhibit Committee promises an exhibit equal to if not surpassing all previous efforts, and in addition to this they are preparing a composite paper for presentation, which will be a masterpiece so far as the uses of our commodity are concerned. Our Vice-President, Mr. E. C. Jones, will be prepared to present a full report covering the International Gas Congress, to be held in San Francisco, 1915, to which Congress our Association is to be host.

The total membership of our Association, as constituted to-day, is 378, and in view of the fact that the International Gas Congress is an assured fact, this should be an incentive for all persons engaged in our profession, who have not already affiliated with the Pacific Coast Gas Association, to do so now, in order that they may participate in the activities of the International Gas Congress in 1915. This is to ask that each and every member of the Association constitute himself a membership committee of one to point out to his co-workers the many advantages to be gained by being affiliated with our Association. Point out to the likely ones the character of papers that are presented before our conventions, and the advantages of being present and taking part in the discussions.

Tell them of the magnificent library which has been brought together under the direction of our Librarian, Mr. E. C. Jones, and which books are at the disposal of all members for the asking. Show them the advantages to be gained by their being in attendance upon our conventions, and if for no other purpose than to get in contact with the men who are the upbuilders of our industry from an executive point of view, as well as from a manufacturing and commercial standpoint.

These are a few of the reasons why all persons engaged in our industry should be members of the Pacific Coast Gas Association. Can we not have your assistance in this small matter? In anticipation of your effort, I am enclosing application blank for such purpose. Let us have at least 500 strong to welcome our colleagues in 1915. Do it now. You will hear further from us as to our 22d Convention, which is to be a bumper. Yours very truly,

Henry Bosworth, Secretary.

## BRIEFLY TOLD.

International Gas Congress.—A meeting of the Joint Committee on International Gas Congress was held at the office of the American Gas Institute, Monday, June 15th, 1914, and was called to order by the Chairman, W. H. Gartley, with the following representatives present:

W. H. Gartley, Chairman.
Geo. G. Ramsdell, Secretary.
T. R. Beal, Empire State Gas and Electric Association.
Edward G. Pratt, Illinois Gas Association.
O. O. Thwing, Indiana Gas Association.
E. C. Jones, Pacific Coast Gas Association.
L. R. Dutton, Pennsylvania Gas Association.
Alten S. Miller, Society of Gas Lighting.
Louis F. Stotz, Secretary, National Commercial Gas Association.

A progress report was submitted by C. W. Hare, Chairman of Committee on Selection of Chairman, Vice-Chairman and Honorary Members, outlining the general plan upon which the committee is working, which was approved, and upon motion the committee was further instructed to appoint a permanent chairman for the Gas Congress. The Secretary submitted a report covering his conference at Chicago with Mr. B. J. Kellum, Chairman of the Committee on Transportation, and reciting their investigation of the subject of tranportation to, and hotel accommodations at San Francisco, with recommendations. This report had been printed and sent in advance of the meeting to each representative. The recommendations were approved and it was decided—the steps thus far taken were confirmed and the securing of necessary special trains authorized. The Secretary was instructed to make a canvas to secure as far as possible the names of those who will go. Mr. Jones presented a communication from the Pacific Coast Gas Association approving of the report and recommendations. Mr. A. S. Miller, Chairman of the Committee on Foreign Invitations, reported that these invitations had been sent out, and the Secretary reported that Dr. A. H. Elliott had sailed for the other side and would present the matter of Gas Congress to several of the foreign societies at their annual meetings. The subject of a permanent chairman for the Gas Congress was again taken up and after discussion the Committee on Selection of Chairman, Vice-Chairman and Honorary Members was instructed to select a permanent chairman of the Gas Congress, and that the presidents of the various gas associations represented on the Joint Committee on International Gas Congress be named as vice-presidents, and that the honorary members be selected from among the representatives of the foreign societies. Mr. Ramsdell, Chairman of the Committee on Publicity, reported that all except four of the gas associations had contributed to the Publicity Fund, the amounts asked

for amounting at the present time to the sum of $850, and that the balance on hand was nearly $575. Considerable discussion was held on the subject of providing for the publication of the proceedings and their distribution, but no definite action taken. Mr. E. C. Jones addressed the meeting at length on the general subject of the Congress, after which the meeting adjourned.

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OUTING OF NEW BUSINESS DEPARTMENT, PUBLIC SERVICE GAS COMPANY.—On Wednesday afternoon, July 1st, the New Business employees of the Public Service (N. J.) Gas Co., held their annual outing at Cella's Fort Lee Grove. A private trolley took the employees and their families to the grove, and the trip was made doubly delightful by an excellent band of music (the prominent Deppisch Band), and even though it rained as the car reached the grove, the trip was a pleasant one. The programme arranged by the Committee, of which Mr. Fred Luhne was Chairman, included dancing and outdoor sports, all of which were thoroughly enjoyed by everyone, despite the fact that the rain made it necessary to hold the contests on the dance floor instead of outdoors. Prizes were awarded for each contest and thanks are due the Wm. M. Crane Company for donating a Waffle Iron and a Griddle as prizes; to the Welsbach Company for a Royal Light, and to the Strause Gas Iron Company for an Iwantu Iron. Refreshments aplenty were served during the day, and at 6:30 P.M. an excellent dinner. After dinner the Chairman called upon Mr. E. G. Kent, Agent of the Jersey City office, for a few remarks, and he was followed by Mr. G. E. Smith. A fact brought out by Mr. Smith was that most of those attending were the same each year, with a few new ones added, and two notable absentees this year who had been regular attendants for many years; one, Mr. Richard Walsh now deceased, and Judge Rikeman, recently retired after years of faithful service, and unfortunately laid up with a broken ankle. After dinner, dancing was the popular pastime, and at 11 P.M., the car took the happy crowd back to their homes, each having spent an enjoyable day. The Committee consisted of Mr. E. G. Kent, Mr. Fred Luhne, Chairman, Messrs. G. E. Smith, D. B. Benedict and Frank Deppisch.

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DEATH OF LEONARD L. MERRIFIELD, M.I.M.E.—Mr. L. L. Merrifield, who died suddenly at his home in Toronto, on Sunday, the 21st June, has left a gap in the circle of men engaged in the gas industry in Canada, which is likely to remain unfilled for many years. He was but little in the public eye, but in the circles in which he lived his active life he commanded admiration, respect and confidence. A man of simple habits, he was thoroughly absorbed in his profession, and fully informed on all matters relating to gas practice and modern process of manufacture. Coming to Toronto in 1893, he was one of the organizers of the Economic Gas Apparatus Construction Co., of which he was chief engineer at the time of his death. He was also Consulting Engineer to several important gas companies, including the Consumers Gas Company of Toronto, by whom his services were highly appreciated. He leaves no family, but is mourned by his wife in Toronto, and by two brothers and two sisters in the United States.

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MR. ABADY'S REPLY TO THE BUREAU OF STANDARDS.—On page 30 of this issue we print a letter from Mr. Jacques Abady in reply to the article by Dr. Rosa and Mr. McBride ("Standards for Gas Service") which appeared in the JOURNAL of June 15th last. This letter of Mr. Abady places him in his right place—that of an engineer fully competent to criticise the matter in Circular No. 32, and stating his opinions in a way that compels attention. Our comment on his original criticism was confined to the manner in which it was made; its matter in many instances we are constrained to endorse.

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AN ILL WIND BLOWS NOBODY GOOD.—Professor E. W. Bemis, the so-called public utility expert, who made the recent gas and electric light rate investigations for Chicago has been appointed by Mayor Harrison to succeed George Weston, the ousted city representative on the Chicago board of supervising engineers. The position carries a salary of $5,000 a year, and the amount will be well spent if it will confine the Professor's efforts to Chicago. He would have been vastly more of a nuisance as a State Public Service Commissioner, to which office Governor Dunne thought of appointing him.

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FIRST GUN IN THE NATIONAL ADVERTISING CAMPAIGN.—"The Story of Nancy Gay." It throws a brilliant light on a burning question of consuming interest. A limited edition has been printed and you can have your copy free by writing at once. Write to-day. A postal will do.

N. C. G. A.,
29 West 39th Street,
New York City.

This, with a charming picture of Nancy Gay, is the first of a series of advertisements to be published by the National Commercial Gas Association; and it is in the current issue of the "Saturday Evening Post," the "Ladies' Home Journal," the "Woman's Home Companion," "Collier's Weekly," "Leslie's Weekly," "Cosmopolitan Magazine," "McClure's Magazine," "American Magazine," "Metropolitan Magazine," "Mother's Magazine," "Literary Digest," and "Review of Reviws." Companies that are subscribers to the national advertising fund, have received electros of this first ad, and are asked to use it 4 times during July in their local newspaper advertising. Beginning August 1st, subscribing companies will receive sets of electros similar to those appearing in the magazines, and copy for their local advertising that will tie-up with the national advertising; all this matter so constructed as to allow for additional local copy. It is proposed to reproduce some of the ads on posters of various sizes for window displays, and make them applicable to every situation. There can be no question as to the advantage the entire industry will derive from this campaign, and the subscribing companies, by using the means available to them, can get a large return for their expenditure. As the fund increases by additional subscriptions that must come as the value of the campaign is better understood, it is intended to launch other plans already perfected.

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ARE YOU USING THE BEST AND CHEAPEST COAL?—Each summer the United States Geological Survey issues a small pamphlet giving analyses made by the Bureau of Mines of the coal samples that the Survey has collected during the year. These analyses are made for the purpose of obtaining data upon which to classify and value the public lands, and for general information regarding the various coal fields of the United States. The latest pamphlet of this series (Bulletin 541-K) gives the analyses of 135 samples collected in Alabama, Colorado, Illinois, Kentucky, Montana, New Mexico, Oregon, Pennsylvania, Utah, Virginia, West Virginia and Wyoming. Most of the samples were obtained in working mines, and therefore represent the coal that is mined and reaches the market. The heating value is given with almost all the analyses, so that it is easy to determine which of two coals is the better. The bulletin also gives a brief description of the samples, including a section of the coal at the point sampled, and an outline of the different classes of coals recognized by the Geological Survey. A copy of the bullctin may be obtained free of charge on application to the Director of the United States Geological Survey, Washington, D. C.

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ILLINOIS GAS ASSOCIATION COMMITTEES.—President L. H. Johnson of the Illinois Gas Association announces these Committees for the year:

*Public Relations Committee.*—H. L. Rice (Chairman), J. H. Eustace, H. O. Channon, Frank J. Baker, L. H. Johnson.

*Technical Committee.*—F. E. Luther (Chairman), C. E. Reinicker, H. L. Farrar.

*Entertainment Committee*—Samuel H. Moore (Chairman), C. E. Reinicker, C. L. Day.

*Nominating Committee.*—W. F. Barrett (Chairman), H. O. Channon, C. B. Strohn.

*Committee on Affiliation.*—H. L. Rice (Chairman), F. W. Bedard, W. F. Barrett.

*Representative on Joint Committee on International Gas Congress.*—Edward G. Pratt.

*Affiliation Representative; American Gas Institute.*—W. F. Barrett.

The next Annual Convention will be held in Chicago, March 17th and 18th, 1915, and the banquet the evening of the second day, March 18th.

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BILL DEFEATED ASSURES REDUCTION.—The Gas and Electric Light Commission of Massachusetts will soon announce a reduction in the price of gas to 80 cents, for both East Boston and Chelsea. The Commission has had before it for some time petitions for the reduction, and now that the Governor has vetoed the 80-cent gas bill for East Boston, the members of the Board feel that the Governor has freed them from the stigma which would have been placed upon them if the bill which passed the Legislature had been allowed to go through.

(*Continued from page 23.*)

matic heaters. Then eliminate all who live in apartment houses. This still leaves a large list to be sifted and there seems to be no adequate way to select the good prospects, except by a preliminary canvass. This preliminary canvass, besides eliminating poor prospects, should be for the purpose of providing information which will be useful when it comes to the point where actual solicitation and selling talk is to be made. Experience teaches that it is difficult to solicit a man unless you are in possession of some information as to his circumstances, conditions at his home, etc. If it is necessary in building up selling talk to obtain this information and data from the prospect, much of the force of the selling talk is lost. By the time the salesman gets to the point where he begins to talk his goods, he has wasted much time and has run the risk of losing his hold upon the prospect. A preliminary canvass will put him in possession of the facts that have bearing on his selling talk, and make it far more convincing than if it were necessary to depend upon information gained during the interview. Among things to be ascertained in a preliminary canvass is the correct spelling of the prospect's name and his correct address, because nothing is more likely to prejudice a prospect than to receive advertising matter erroneously addressed or with his name misspelled. The importance of spelling names cannot be overestimated, especially when it is desired to make the most favorable impression. Then it is necessary to ascertain the prospects's present source of hot water supply, whether a circulating gas heater, coal heater, etc. How much more effective a salesman would be if, on entering a man's office, he is fully aware that his present source of supply is a coal heater which consumes a certain amount of coal, costing as much if not more than gas would cost; or if he knows that the hot water supply is irregular, or that the heater is out of commission part of the time. Such information would make it possible for the salesman to frame his selling talk to fit the man's circumstances. In the preliminary canvass it would be well to ascertain whether or not servants attend the present system, whether it is entirely satisfactory, how much fuel it uses, how many bathrooms are supplied, how many there are in the family etc. Common sense tells us that this information is valuable in making a solicitation. Such information also as to whether or not the family resides in the country in the summer time should be gathered. A great many people depend upon a coil in the furnace during the winter and as they spend from two to four months in the country in the summer may feel that they do not need a heater. Such prospects have not the need for an automatic heater they would have if they remained in the city. It is well for a salesman to know such conditions as he may be able then to concentrate his talk upon the advisability of a heater which will supply hot water during the spring and fall when the furnace is out of commission. The preliminary canvass will also elicit information regarding the standard of living maintained by a prospect. If a solicitor gives to a man and is aware that his family was accustomed to luxuries, and that the price is less important than the degree of convenience and comfort of the appliance he tries to sell him, he will find his task much easier than if he were wholly in the dark. Likewise, in ascertaining the circumstances of the family, if the preliminary canvass discloses that the head of the house is wealthy but watches expenses with extreme care, the solicitor, in making his final selling talk, would know how to proceed. If he is aware that the head of the house is interested in anything pertaining to the household and its comforts, he will find it much easier to interest such a prospect than one who leaves the details of the management of his home to someone else and whose interest ceases when he draws the checks to pay the bills. Another point worth while to ascertain is the man's income. This may seem impossible, but in a general way it is easy to find approximately what it is, and this adds greatly to a salesman's fund of information. If he is a true salesman, he need not concern himself so much with classifying the information. His selling talk will unconsciously be based upon the information. There are also frequently many special conditions in homes which a preliminary canvass will disclose, so that when the final solicitation is made, it is not necessary for the salesman to work in the dark, but he will be armed to meet any situation that may confront him.

This preliminary information should be filed in a card index. It may be disclosed that certain names are prospects only for circulating heaters. The card index should be so arranged as to turn up such prospects either by color of the card, or by some identifying mark, readily seen in going over the cards when sending out literature on water heaters. The water heater companies prepare printed matter for all kinds of prospects, and care should be used in selecting the kind of literature that goes out. The preliminary canvass is sure to develop prospects that are ready to be closed at an earlier date than most of the general run. These should be filed to be turned up at the right date and given to a solicitor. It is not necessary that the person who made the preliminary canvass should get the card at the time the final selling talk is made. Of course the man who made the preliminary canvass is in possession of all the facts, some of which it may not be practical to enter upon the card, but on the whole a good plan would be to have the preliminary canvass carried on by ordinary men in the field, and if deemed advisable, turn the selected and sifted list over to an expert, who, with this information in his possession, could do some intensive work, which should bring forth excellent results.

The question may arise, how can this preliminary information be obtained without spoiling a prospect. A good plan is to give the canvasser a number of cards in one neighborhood, instructing him to call at the houses, and if possible interview the servant. A man with common sense and resourcefulness, introducing himself as representing the gas company, can easily engage the servant in conversation by stating that he is securing some information regarding the various gas appliances that may be in the house. The interview could be opened with a question regarding the gas range; whether or not it is giving perfect satisfaction, explaining that the gas company, as is usually made clear in its advertising matter, is seeking to get in closer touch with the consumers. Then let the conversation drift to water heaters, and with judicious questioning it should be possible to obtain much of the information outlined above. This of course depends upon the man who is sent to get it. A bungler may fail to grasp the significance of his task, and without having interest in his work may get the information in a perfunctory manner, and carelessly; but the average gas salesman sent on a mission of this sort, would quickly fall in with the spirit of the canvass and, if proper incentive is offered, he will get a great deal of information. Such information can best be secured during the dull season, immediately following the holidays, when there is ample time to devote to such work. Then during the months of March, April and through May, the intensive work of soliciting may be prosecuted. In the meantime the prospect should be circularized with appropriate literature, both at the home and at the man's place of business, being careful to avoid what might seem a bombardment, as this might arouse a prospect's resentment and interfere with the closing of the sale. Then just before the intensive work begins, each prospect should receive a personal letter, making an appointment for the solicitor and signed by some officer of the company, divesting the letter of all appearance of "circular" matter.

It is then up to the salesman. If the company is fortunate enough to have an expert water heater salesman, his path has been cleared of many obstacles, and he should be able to render efficient service. What to say, what to do, how to close the sale, are things for the salesman to judge for himself. No two salesmen go about making a sale the same way. Every salesman, however, will appreciate the value of preliminary information. It should give him confidence and help to impress the prospect. Likewise no one can estimate the results of such methods. An automatic water heater is not like a reflex lamp, to be bought after a moment's consideration. It takes time to bring about a sale. Most of the actual results of this year's work will be felt next year and the year after. It's much like planting trees—you can't plant to day and sit in its shade to-morrow. Immediate results are bound to be felt, however and in time you will reap the harvest. In places where it is not possible to employ an experienced water heater specialist to close up the prospects shown in the preliminary canvass, it is necessary that the regular sales force be thoroughly drilled in the merits of the water heater they are to sell and wherein it is superior to other types. The National Commercial Gas Association has prepared a series of lessons in its course on the utilization of gas appliances which makes it easy to instruct a body of salesmen in the mechanism of water heaters. In addition to this training, salesmen should be brought into touch with a representative of the water heater company making the type of water heater you propose to handle, and learn from him the selling points and method of overcoming obstacles which he has found successful.

There is a division of opinion as to the advisability of installing automatic water heaters on trial. This is a detail that every new business manager must work out for himself, using his knowledge of the field, and his judgment with reference to individual prospects. Where a preliminary canvass is made, if the man who is eventually to be solicited is not actually interviewed in person, it should be pos-

sible to ascertain from the situation at his home whether it would be good policy to offer to install a heater on trial for a stated period. As a general rule, it would seem that the most likely prospects only should be given this special consideration, because of the expense of installing and later disconnecting, together with the negative effect of having to remove a heater from the premises. After a salesman has made his solicitation he should return the prospect card with notations on the back showing the result of his work. If a sale is effected it should be noted, or if it is necessary to call again, this should be noted for the guidance of the salesman making future calls. If the saleman is to call again the card should be returned to him at the proper time. Thus he has before him all the data relating to that particular case, a veritable history sheet which will enable him to properly handle the prospect. It is also possible, if for any reason it is necessary to put some other man on the case, for the new man to have all the facts in his possession the same as if he had made the preliminary canvass, the first call and subsequent calls. This list of prospects should be augmented by the addition of new names as they are procured, and when heaters are sold or other circumstances affect the list they should be carefully weeded out. Next season you will have a live list of prospects to circularize, to call upon and to follow up. Much depends however upon the person to whom the cards are entrusted.

The advertising campaign which paves the way for the actual selling campaign should be carefully planned. Plenty of newspaper space, direct advertising and personal letters should be employed, their value lying as much in presentation at the right time as in the style in which it is prepared. For instance, after the prospect list has been whipped into shape, each prospect should receive a round of printed matter addressed to his home. A week later another round at his office, and a week later another round at his home. Follow these with newspaper space while the men are in the field. The visit of the solicitor should be preceded by a letter with a personal tone to to it, announcing his coming visit. Every good means of publicity may be employed to advantage, for it is impossible to tell which form of publicity will finally make the best impression.

The method of compensating the man engaged in the preliminary canvass may be different according to the situation In some companies salesmen are paid a salary, and bonus based on the point system; others pay straight salaries. In either case the method may be adjusted to suit the circumstances. A good way is to allow the man engaged in this work a certain number of points, depending upon the number of calls made and the number of cards turned in with preliminary information. Add to this a liberal bonus in case a sale is made.

The automatic water heater is an appliance that has come to stay, and it is only a matter of time when it will find its way into a large percentage of the homes in every city. It depends upon gas companies to push the sale of this appliance. It is unquestionably one of the most convenient devices for the comfort of the home, and with the changes in standards of living it is good business to foster and promote in every way possible the sale of gas water heaters in any community.

## High Pressure Gas Lighting and the New Silica Lamp.

[From a paper read before the London and Southern District Junior Gas Association by Mr. George Keith.]

I propose to confine myself to a description of a new type of lamp upon which we have been working for nearly three years with varying success. This has come to be known as the "Silica" lamp, and is the outcome of an extended experience with high pressure gas lamps and apparatus, dating from the earliest days of intensified incandescent gas lighting. This lamp was designed to overcome some of the maintenance difficulties which such an experience has shown to be almost inseparable from the usual types of high pressure gas lamps. These are mainly due to the destructive effects of the high temperatures on the appearance of all parts exposed to the products of combustion, and which, consequently, necessitate a good deal of cleaning and renewing to keep the lamps up to the mark, especially as regards appearance. So long as only ordinary globes were used, such troubles seem to have been unavoidable; but the introduction of the comparatively new product, fused silica or quartz, opened up new possibilities. Fused silica, as you are doubtless aware, is a highly refractory material, capable of withstanding sudden changes of temperature without breaking (mainly owing to it having a very low co-efficient of expansion). In a burning lamp, though the globe is red hot, it is quite unaffected by having cold water sprayed on it.

At the time experiments were begun, silica articles of sufficient transparency had not been made of any appreciable size, or on a commercial basis; but the manufacturers have now attained a high state of perfection in regard to form and transparency; while at the same time the cost, although still relatively high, has been brought within commercial limits. When it is mentioned that the temperature at which the articles are shaped is about 3500° F., and the temperature required for the subsequent glazing is about 3700° F., the practical difficulties will be appreciated. Even at the best, the material at which the present globe or cup is formed absorbs an appreciable amount of light; and in order to compensate for this loss, means had to be devised to avoid a lowering of the efficiency previously attained in high pressure gas lamps. I need not enter into all the experiments which ensued; but it is sufficient to say that the solution was found in making the globe as small as conditions would permit, and confining the flame in this small space, and incidentally excluding all secondary air. The concentrated heating effect on the mantle thus obtained not only compensates for the loss of light by absorption of the silica, but gives a substantial increase in efficiency and several other advantages.

This concentration of heat, however, while giving the desired effect on the mantle, introduced some very serious practical difficulties; the chief of them being that of keeping the temperature of the burner nozzle within practical working limits, so as to prevent the pre-ignition of the mixture of gas and air. This mixture is, of course, in a very explosive condition, not only containing the total quantity of air required for complete combustion, but being, in addition, heated to a very high temperature. The principles employed in our ordinary high pressure lamps had to be extended and improved upon; but even with all such expedients, the temperature of the nozzle is considerably greater than in the ordinary high pressure lamp with large globe. The next, and most important point of all, was the question of the material for the burner nozzle, and as the principle before referred to requires it to be of good thermal conductivity, we have been confined to the use of metal. A large number of experiments were made in obtaining the correct material to withstand the severe conditions to which the nozzle is subjected. Several materials tried at first gave promising results, but in course of time broke down and caused trouble through excessive oxidation. We are now using a material which gives quite good, practical results, although we are still continuing research in this direction, and at the present moment are testing some alloys which look very promising. Tests of this nature naturally take a great amount of time; and it is mainly due to this cause that the considerable and unexpected delay has arisen in placing this lamp on the market. The installation of lamps at the recent National Gas Exhibition, which was the first public demonstration of them, required a considerable amount of extra attention, owing to the failure of the material of which the nozzles were made. We appear to have overcome this difficulty, and the nozzle now supplied will stand the conditions, and give no discoloration of the globe through oxidation or sublimation.

When the above difficulties were satisfactorily overcome, it was found, upon putting the lamp out on the market under everyday conditions, and working with gases of varying composition, that under certain conditions there was a tendency for the contents of the heater and mixing tube to explode on the turning out of the lamp, and so destroy the mantle. After many methods for preventing the flame passing back into the heater had been tried with varying success, the difficulty was overcome by enriching the mixture in the heater beyond the explosive range at the moment of extinction. While this is a comparatively simple operation to carry out when the lamp is controlled by its own cock, it is quite a different matter to accomplish when the lamps are controlled by means of automatic lighters working either directly off the main or controlled by means of a special control cock at a distance. This problem has, however, been satisfactorily solved.

When once the feasibility of dispensing with a large globe, and substituting a small silica cup, had been demonstrated, the way was left open for a complete revolution in the design of the lamp. In the ordinary lantern, either high pressure or low pressure, where a large glass globe is used, the dimensions of this have to be taken as the basis on which the lines of the lamp are evolved; and, in addition to this, when the lamp is intended for outside conditions, the use of a glass globe necessitates a reflector largely for the purpose of protecting it when hot, from the effect of rain. In the case of the silica globe,

this limitation no longer exists; and, therefore, greater scope in the production of a more pleasing form is permitted. These points are of particular importance in the case of lamps used for the purpose of lighting shop fronts, for which the suspension lamp has been primarily designed.

Apart from appearance, the particular advantage of using the silica globe is that the cost of maintenance ought to be considerably reduced, due to the fact that the ordinary cleaning necessitated by the action of dust, rain, etc., on the globe is entirely dispensed with, as owing to the high temperature at which the globe is kept when the lamp is burning all the dirt is burnt off. As this fact enables the intervals between cleanings to be greatly increased, the risk of breakage of the mantle by opening and handling of the lamp is naturally very much reduced. It is also found that the presence of quite a considerable hole in the mantle does not necessitate its immediate removal, nor does it greatly reduce the light. It is, in fact, quite possible to obtain a good light with the bottom out of the mantle; or, even should the mantle drop away entirely from the top, there is still a fair light given owing to the fact that the mantle is retained in close proximity to the flame. In mentioning this fact, however, I do not wish to convey the idea that the mantles should be allowed to remain in such a condition for an unlimited time. These features will be appreciated by anyone who has had experience with high-pressure lamps. The globe may become dirty in course of time, due to the gradual deposit on the inside of slight impurities present in the gas, but this has been reduced to the minimum by means of a special purifying apparatus, which forms an important feature in the lamp. The globe may also be dirtied inside by imperfect combustion of the gas due to bad adjustment, or to metallic oxides from the burner, etc., but a little care will avoid such accidents.

Although the standard type of suspension lamp is not ordinarily fitted with a reflector, special reflectors may be attached to suit any particular purpose. And here, again, the smallness of the silica cup allows greater scope in the style of reflector. In the ordinary way, however, the very good diffusion produced by the slightly opalescent silica globe minimizes the necessity for a reflector; and for the same reason the light, while brilliant, is not so trying to the eye as the unprotected high-pressure mantle. An additional advantage obtained by dispensing with the reflector is that the design of the lamp allows a certain amount of light in an upward direction, which is specially desirable for shop front lighting. Where reflectors are applied they are very efficient, owing to their closeness to the source of light; and as the law of inverse squares applies in this case, the reason will be appreciated. The reflecting surface does not deteriorate, as it is not exposed to the products of combustion or to the extreme heat inside, as in the case where reflectors are brought close to the source of light in the usual type of high-pressure lamp; and the smallness of the silica globe or cup does away with the usual limitations inseparable from a large globe.

Special consideration has been given to the facilities for adjusting the burning mixture in the lamp; and in this respect a new principle has been adopted which offers considerable advantages over the usual method of adjusting the quality of the mixture by merely throttling the amount of air, in that it more satisfactorily compensates for variations in the quality of the gas, and is, in consequence, more flexible in its adjustability to suit the gas supplies in different localities, without requiring such a variety of nipples as is necessary with the ordinary method of adjusting the air supply. The adjusting screw is arranged to be nearly vertical; so that it can be readily adjusted from the ground by means of a cleft stick, instead of necessitating a ladder. Yet another special feature is the facility with which the nipple can be removed for cleaning and adjusting the size when necessary. The small cap projecting from the side has simply to be unscrewed, when the nipple-holder may be removed.

It is somewhat early to give any data as to the cost of maintenance; but it is confidently expected that this should not be more than about one-half the present cost of maintaining outside high-pressure lamps. Cases have been known where the silica cups have not been cleaned for six or even eight weeks without serious discoloration; but I do not think it wise to allow them to go so long, as any deposit that does form in the inside is apt to combine with the surface of the silica if subjected to continuous heating, and, though removable, is not so easy to clean as when regularly dealt with. The method of cleaning is to use ordinary commercial hydrochloric acid, and to about half fill the cup with this and swill it round, and, after emptying it out, rinse with clean water. The acid may be used repeatedly until exhausted. Should the discoloration not come off with cold acid, it can generally be removed by heating the acid in the cup itself over a bunsen flame. Should the cups become so discolored that these methods do not completely clean them, there are other ways. No globe need be considered hopeless while it is whole, and at the worst can be thoroughly cleaned and reglazed at a small cost. The best course, where a number of lamps are in use, is to have a few spare globes to exchange in the lamps, and bring the dirty ones back to the depot, where suitable arrangements are provided. Special boxes for carrying a number of cups should be provided, as they should not on any account be nested into each other, or they may jam and break. It should be appreciated that, while these cups will not break by heat or cold, they are no stronger mechanically than ordinary glass; and as they are comparatively expensive, every possible care should be taken in handling.

The method of forming the mantles is practically the same as in our ordinary high-pressure lamps.

The adjustment of the mixture of gas and air should receive careful attention, more especially in the direction of seeing that there is no deficiency of air. It is better to err on the side of excess of air than deficiency, as, in the latter case, owing to the absence of all secondary air in the cup, complete combustion will not take place there, with a consequent tendency to discolor the cup besides lowering the efficiency. It is therefore of the first importance to see that the lamp is capable of taking in a substantial excess of air when the supplementary gas supply is shut off by the regulating screw. If this is not the case, the nipple should be reduced in bore until such excess of air is noticeable. Wherever the cups consistently get a dull grey deposit inside, deficiency of air may be suspected; and the results will be unsatisfactory and frequent cleaning necessary.

The gas consumption in the 1,000-candle power lamp is about 17 cubic feet per hour, and in the 1,500-candle power unit about 25 feet.

## Report of the Refractory Materials Committee, Institute of Gas Engineers (England).

It will be remembered that the use of silica retorts in the United States of America was commended by Mr. Ernst Körting and Mr. R. M. Searle, of New York, when the committee's report was presented at the last institution meeting, and inquiries have therefore been made by the committee to ascertain the views of engineers in America. Through the kindness of Mr. Herman Russell, of the Rochester Railway and Light Company, the opinions and experience of several engineers and manufacturers of these retorts have been obtained. The American Gas Institute has appointed a Refractory Materials Committee, of which Mr. Russell is Chairman; and your committee have entered into communication with the American committee, and an exchange of reports and information has been arranged, which it is felt will be of very great mutual assistance.

*Silica Retorts.*—The material of which these retorts are made contains about 95 per cent. of silica, and is believed to be identical with the ganister quartz found extensively in South Yorkshire, Wales, and other parts of Great Britain. The quartz rock is crushed, and usually has a binder of about 2 per cent. of milk of lime. The manufacture is very carefully conducted and the material has an excellent appearance, being mechanically strong and well made.

The following are the questions addressed to Mr. Russell, and the replies:

1. Is silica material used for whole retorts, or is it made into segmental tiles for built-up retorts?

Although "whole" or moulded, retorts are being tried in lengths of about 18 inches for vertical settings, all the experience so far obtainable relates to segmental retorts built up of tiles, or a combination of bricks and tiles.

2. Is there any expansion in the length of the retort when heated up? If so, how much, and how is this allowed for?

Expansion takes place from $\frac{1}{2}$ to $\frac{3}{4}$ inch per lineal foot in the length and periphery of the retorts; and allowance must be made for this to be taken up when the heats are raised. One method for overcoming the expansion is to make the joints with thick paper or straw board, which burns out and forms a thin carbon joint; or use a cement made of mild aluminous clay, which will shrink when the retort settings are put to work.

3. Does the material crack when first lighted up, or when in use, by reason of the cold air rushing into the retort when the lid is opened?

The general experience is that well-made silica retorts do not crack from these causes; and this is probably greatly assisted by the fact that they are made of segmental tiles, and also by the frequent practice of making the mouthpiece end of the retort of solid moulded fire

clay, which sometimes extends as far into the settings as the first cross wall. The cold air which enters the retort when the lid is opened first, impinges on this fire clay piece and by the time it reaches the silica material the temperature of the air has been considerably raised, and it has no harmful effect.

4. Are silica retorts used in connection with stoking machinery? If so, what is the type?

Silica retorts have been used in settings worked with De Brouwer, Fiddes Aldridge, Riter-Conley and Bredel hydraulic discharging machines.

5. If stoking machinery is employed, do the retorts give entirely satisfactory results?

No difficulty is said to be experienced in this respect; and some engineers state that less carbon appears to be formed on the inside of the silica retort, while the surface becomes glazed over, thereby facilitating discharging by pushers. No doubt, also, the fire clay retort, at the mouthpiece end, takes up the extra wear and tear usually experienced from stoking machinery at these points.

6. What is the maximum life which has been obtained without patching a silica retort?

The life of silica retorts is said to be about 3½ to 4 years, when used with stoking machinery, and considerably longer than that of clay retorts made in the United States.

7. What is the saving in fuel, in a good regenerative setting, when employing silica retorts, as compared with fire clay retorts?

There is a consensus of opinion that the silica retorts have a greater heat conductivity than those made of clay; and this is said to show itself in a lesser fuel account, although the greatest advantage in this respect is found in the increasing carbonizing capacity of the retorts, owing to the possibility of burning off the charge more quickly.

It will be observed that the experiences reported are favorable, and no doubt some engineers on this side will decide to experiment with silica retorts. It is suggested, however, that these trials should not be too extensive at first, as there are several points which require care—such as the arrangements made for taking up expansion. The material should also be thoroughly well made, free from cavities, possessed of good physical strength, and not loose and friable, as is often the case with highly silicious material. The use of silica retorts has been to a considerable extent developed by several large companies in the United States; and as it may not be possible for engineers in this country to avail themselves of the experience of these firms, they will have to make arrangements with manufacturers here for trial retorts. It should be mentioned, however, that No. 1 Grade Silica material in the third section of the standard specification covers bricks and blocks made from ganister quartz; and generally the material should be in accordance with the conditions and tests specified therein.

*Testing Refractory Materials Under Load.*—The importance of testing samples of fire bricks and retort material in such a manner as to approach as nearly as possible working conditions, is obvious; and at the time of the preparation of the standard specifications, the joint committee of engineers and manufacturers gave the matter careful consideration. Unfortunately, very little technical information on this subject was available at the time, and the refractory tests specified are therefore carried out, with the samples lying free in a gas or electric furnace, as has hitherto been the practice in clay testing. Recently the importance of the load factor on the fusibility of refractory materials has been raised; and the Committee, therefore, in colaboration with the Retort and Fire-brick Section of the Society of British Gas Industries arranged for an investigation in this subject. Samples of the clays employed in the manufacture of fire brick and retort material were obtained from Stourbridge, Yorkshire, Newcastle and Scotland, and tested in the usual way, and also when carrying various loads. The results are tabulated below:

*Group I.*

| Experimental Number. | Normal Melting Point Degrees C. | Melting Point under Pressure of 34 Lbs per Square Inch. | Melting Point under Pressure of 72 Lbs. per Square Inch. |
|---|---|---|---|
| 1 | 1650 | 1435 | 1380 |
| 2 | 1630 | 1410 | 1350 |
| 7 | 1580 | 1380 | 1350 |
| 12 | 1690 | 1435 | 1410 |

*Group II.*

| Experimental Number. | Normal Melting Point, Degrees C. | Melting Point under Pressure of 34 Lbs. per Square Inch | Melting Point under Pressure of 112 Lbs. per Square Inch. |
|---|---|---|---|
| 3 | 1690 | 1460 | 1380 |
| 4 | 1710 | 1500 | 1435 |
| 5 | 1670 | 1460 | 1380 |
| 9 | 1750 | 1580 | 1580 |
| 10 | 1690 | 1500 | 1460 |
| 11 | 1670 | 1460 | 1380 |
| 16 | 1730 | 1460 | 1410 |
| 17 | 1770 | 1520 | 1410 |

N.B.—No. 17 is a typical china clay of first-class quality, and was used for the purpose of comparison. It is interesting to note that some of the clays very nearly equal it in refractoriness.

The minimum crushing strength of the fire bricks allowed in the specification is 1,800 lbs. per square inch; and the above results, which show a decrease in refractoriness of 12 to 13 per cent., when subjected to a load of 54 pounds per square inch, are therefore very surprising. Whether these results will be entirely borne out in practice, it is impossible to say, but it is improbable that the melting point of fire bricks is lowered to such an extent in retort settings. The matter is one of very great importance to engineers and manufacturers, and it is felt it would be unwise to attempt any alteration of the specification without further information. It may be pointed out, however, that the great majority of the best retort and fire brick material available in this country generally falls just within the limits of refractory test specified by the committee; so that the question of increasing their severity in this respect will have to be very carefully considered. It is therefore proposed by the committee to regard these figures as a preliminary exploration of the subject, and to continue the investigation in the ensuing year.

No complaints have been heard in respect of material supplied in accordance with Secs. 2 and 3 of the Standard Specification (fire-clay bricks, blocks, tiles, etc., and silica material); but dissatisfaction is still sometimes found with regard to retorts made to conform to Section 1. No trouble appears to be experienced in normal working in the matter of refractoriness, and the complaints mostly arise from the fact that the retorts are covered with surface cracks, being loose in texture and contain cavities and fissures more or less extensive. Such defects are serious ones, and ought to be remedied at once. It cannot be too strongly urged that porosity should not be obtained by cavities of this nature, and that, while density must be avoided, retorts should possess sufficient homogeneity to give good services and physical strength.

Another matter which has been under the serious notice of the committee is the destructive influence on retort settings of dust mechanically carried over with the producer gases. This, owing to the large quantities of oxide of iron and other fluxes it contains, results in the formation of fusible slags, and so involves the destruction of material which, in the absence of this dust, would resist the highest temperatures required. The attention of all engineers is therefore earnestly directed to the necessity of reducing this injurious dust to a minimum, if satisfactory results are to be obtained with good material.

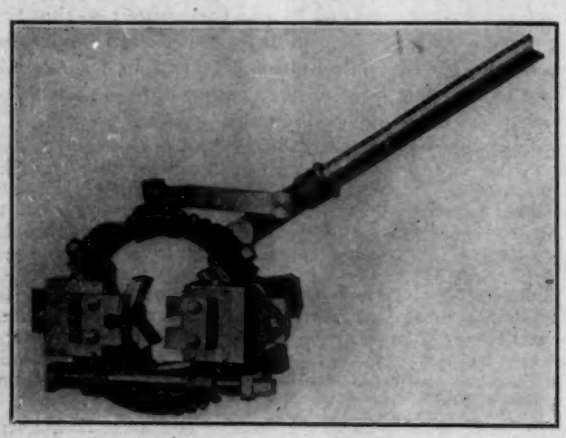
## New Methods and Appliances.

Counteracting the Effect of Yellow-Red Rays.—Artificial light, particularly that from carbon or metal filament electric lamps, incandescent mantles, etc., does not perfectly replace daylight, not possessing its whiteness. In such light the yellow-red rays are present to a greater or less extent, and consequently the objects illuminated by it do not appear in their natural colors. Moreover, the light is fatiguing to the eyes, and is dull when compared with daylight. Mr. Paul Grosheintz has taken out a French patent by which, it is claimed, these inconveniences are avoided. The light source is surrounded by glass tinted a cobalt blue to absorb the excess of yellow-red rays; and it is stated that the glass does not appear blue nor the light source yellow-red—both being colorless. Care has to be taken in the selection of the color employed. Only cobalt blue can be utilized—not, for instance, ultramarine, or blue obtained with oxide of copper. The loss of light caused by the blue filter is amply compensated for by the better quality of the light delivered. The filter can be placed either directly or indirectly before the light source. In the former case, a cobalt blue globe will be used instead of a white glass one; while in the latter a shade of this color will be similarly placed, and surrounded by a white globe.

Ineffective Pipe Insulation.—The Bureau of Standards, Washington, D. C., as the result of an investigation of the subject of surface insulation of pipes as a means of preventing damage to underground metallic structures by stray currents from electric railroads, has prepared a report which is a warning to pipe manufacturers and to gas and water companies, and to engineers that the materials usually employed for insulation cannot be relied upon for more than temporary efficiency. Tests were made of the various substances available for the insulation of underground structures, including paints, pitch and asphalt dips, pitch and paper, asphalt and felt wrappings, etc., but the efficiency of the protection extended but little more than a year, and in many cases only about 4 months. The average life of the paints was found to be about 116 days, the maximum from any specimen being but little more than a year. The wrappings lasted longer than the paints and dips, but none of them much more than 400 days. It seems from the results that the failure of the coatings is caused by absorption by them of water which in

time penetrates to the iron, allowing the current to flow and destroy the coating by electrolysis. After the first appearance of current flow the destruction of the coating was observed to proceed very rapidly.

PIPE CUTTER.—A 2½-inch to 4 inch pipe cutter designed to cut pipe square without any burrs is being placed on the market by a western maker. The cutter is provided with an automatic feed, and use is made of a peculiarly shaped knife with which the cut is so regulated that a very thin section of the pipe is cut out. The pipe is accordingly not depressed and the end of the pipe is left clean and square without any burrs. The manufacturers claim that this cutter will



not split the pipe and that it is easy to start a threading die after cutting the pipe. It is operated by a ratchet and can be used in any position. It is a development of smaller cutters which have been put out by the same company.

# Correspondence.

The JOURNAL is not responsible for the opinions expressed by correspondents.

### Mr. Abady Replies to the Bureau of Standards.

174 Palace Chambers,
Bridge St., Westminster, S. W.
June 25, 1914.

Editor, AMERICAN GAS LIGHT JOURNAL: SIR—Having noted the reply of Messrs. Rosa and McBride to my criticism of the Bureau of Standards, Circular No. 32, and your comment thereon, I hope you will print this communication.

After having read the reply and re-read the circular, I feel justified in re-iterating my original contentions, and in saying that Messrs. Rosa and McBride are in error in stating that I have misunderstood the genesis or the substance of the circular, or that I have misinterpreted or misquoted it.

I have done nothing of the kind; my views are not founded on an ignorance of American gas affairs. Nor apparently are they different to the view held by American gas engineers. My chief contentions were in criticism of—

(a) The "elastic" foot.

(b) The pressure regulations.

(c) The calorific standard suggested and the dual candle power standard.

(d) The general style of the circular.

In my points (a), (b) and (c), I am supported by American gas engineers, and as evidence of this I cite Mr. J. B. Klumpp's letter (as Secretary, Public Relations Committee, American Gas Institute), written to the *Gas World*, London, and published in the issue of May 9th, at page 621. I also cite Mr. Klumpp's paper presented to the annual meeting of the Indiana Gas Association—a précis of which is in the *Gas World*, London, of April 11, at pp. 502-503.

The 4th point, viz., the manner of my criticism is certainly condemned. As to that, I can only repeat what I stated before, that the criticism was quite impersonal, and written with a full knowledge of and the greatest respect for the ability and zeal of the staff of the Bureau of Standards.

If the manner of controversy I adopted has given offence to anyone, or hurt anybody's feelings, I am very sorry; and those who know me personally will, I am sure, have no difficulty in understanding the sincerity of this statement. The substance of the criticism I uphold. Yours faithfully, JACQUES ABADY.

# Items of Interest
## FROM VARIOUS LOCALITIES.

THE Revere, Mass., employees of the Suburban Gas and Electric Company had an outing and field day a few weeks ago at Suntaug Lake, Lynnfield, where they had a most enjoyable day. The trip from Revere was made in autos, furnished by the company, and at Lynnfield employees from the Salem Electric Light Company, also controlled by the Tenney interests, joined the party. There were a number of field sports, during the day, and a fine dinner was served at 3 P.M. The Salem contingent were obliged to leave earlier than expected on account of the big Salem fire. There were about 40 present from Revere, and about 25 from Salem. The arangements for the Revere contingent were made by A. F. Gardella and I. F. Sternberg.

THE report of Messrs. Lyndon and Elrod, on the Houston (Tex.) Gas and Fuel Company, will probably be ready for the city authorities before those on the two telephone companies, as practically all of the records and accounts of the gas company are kept in Houston, and the physical examinations and valuation has been completed.

MR. WILLARD B. OSBORNE, for several years head of the Gas Department of the Riter Conley Manufacturing Company, has resigned from that corporation to become Managing Engineer of the Lowell (Mass.) Gas Light Company. Mr. Osborne has had wide experience and is an engineer of acknowledged ability.

THE Board of City Commissioners, of Dallas, Texas, has adopted an ordinance amending the ordinance governing the collections of gas bills. The amendment makes the bills payable at any time during the month, the consumer receiving his 10 per cent. discount as at present, provided the bill is paid within ten days after it is rendered. The amendment was passed in order to allow the Dallas Gas Company to make readings throughout the month instead of at the close of the month, as at present.

THE properties and franchises of the Huntsville (Ala.) Gas, Light and Fuel Company were sold at receiver's sale and bought in by the bondholders' committee for $25,000. This is a legal formality necessary for the steps that are to be taken to develop the business on an extensive scale.

THE growth of the Cambridge (Mass.) Gas Company is shown by the following table:

| | Feet of Gas Sold. | Meters in Use. |
|---|---|---|
| 1870 | 44,665,000 | 3,334 |
| 1880 | 57,400,000 | 4,333 |
| 1890 | 124,455,000 | 5,779 |
| 1895 | 169,352,000 | 8,362 |
| 1897 | 200,809,000 | 9,364 |
| 1900 | 276,284,000 | 12,623 |
| 1901 | 308,680,000 | 13,548 |
| 1902 | 325,935,000 | 14,689 |
| 1903 | 415,705,000 | 16,030 |
| 1904 | 420,722,000 | 17,235 |
| 1905 | 440,000,000 | 18,413 |
| 1906 | 468,550,000 | 19,988 |
| 1907 | 533,033,000 | 21,645 |
| 1908 | 585,144,000 | 22,873 |
| 1909 | 620,594,000 | 24,737 |
| 1910 | 669,983,000 | 26,560 |
| 1911 | 717,054,000 | 28,343 |
| 1912 | 762,630,000 | 30,286 |
| 1913 | 835,722,000 | 32,377 |

AFTER five franchises for gas plants in Cordele (Ga.) have gone by default within the past two years, the city council in session recently granted a franchise to the American Gas Utilities Company, of Atlanta, that is expected to result in the location of a plant here within the next few months. Unlike all of the other concerns, this company has placed with the city council a certified check for $500 as security that work will be started on the plant within the next six months, with the contract that when work is begun a bond of $5,000 will be placed in one of the local banks to secure the city against damage to property or life while work of construction is in progress. A representative of the company claims that surveyors will arrive in the city to begin their work at once.

THE Statesville (N. C.) Gas Company announces that it is ready to make connections in West Statesville and begin furnishing gas. The pipe lines will be laid as rapidly as possible and the remainder of the town will be furnished with gas at an early date. The gas plant was finished some weeks ago, but delay was experienced in laying pipe lines. The old owners of the franchise and plant never began operations and allowed their franchise to expire by limitation, and the new company could not come to any agreement about the pipe lines which were laid by the original company and new lines are being laid.

JUDGE WILBUR F. BOOTH, of the United States District Court, recently denied a motion to dismiss the suit of the St. Paul (Minn.) Gas Light Company to restrain the city of St. Paul from putting in effect the ordinance fixing the rate of gas at 85 cents per 1,000 cubic feet. The motiou was made on the ground that no Federal issue is involved in the dispute and that the court hence has no jurisdiction.

BY agreement between the city officials of Fairfield, Ia., and the Interstate Power Company, owners of the Fairfield Gas and Electric Company, new rates have been established. By its terms the rate of $1.45 per 1,000 feet, with a 5 per cent. discount for prompt payment, is fixed as the price of gas; and while the rates provided in the ordinance, which was attacked by the company, are about a 20 per cent. reduction in the rates for electricity fixed by the terms of settlement (except that the minimum bill is fixed at $1 and all electric bills are subject to a 5 per cent. discount for prompt payment), it is expected that this compromise will result in a better feeling toward the present owners and will result in improved service and increased use of the products of the company, which will in itself cause the company to increase its plant to take care of the necessary output.

MR. H. T. WILLETT, Secretary of the Springfield (Ills.) Gas and Electric Company and the Springfield Consolidated Railway Co., has resigned because of ill health, and Charles Walsh, assistant to the chief auditor of the Hodenpyl-Hardy Company, at New York, has been appointed Secretary. Mr. Willett has been in ill health for some time, and on the advice of his physician, will take a vacation and will not resume active work for a year at least. He has been with the local company 7 years. At a meeting of the directors resolutions were passed regretting the state of Mr. Willett's health, and hoping for a speedy recovery Mr. Willett left for Scituate, Mass., where he will remain for some time.

AS evidence of what the Austin (Tex ) Gas Light Company thinks of Austin, the Company has rebuilt its plant within the last 18 months so that it is now equipped to take care of a city with three times the population of Austin. And the company officials are convinced that before many years the plant will be called upon to deliver its full capacity. A great deal of work has been done during the last year in renewing small mains to obtain uniform pressure, and the greater part of the effort has been toward giving perfect satisfaction to present customers before inaugurating the campaign of extensions that is planned for the future. New boilers of 150-horse power are being installed and the purifying plant improved.

THE City Council of Milwaukee, Ore., is considering the application of the Clackamas Gas Company for a 50-year franchise to supply gas to that community, which is some 7 miles southeast of Portland.

THE Brenham (Texas) Gas Company has voted $20,000 to be expended in improvements on its plant. Work will start early this month on the extension of the mains in the southern and eastern parts of the city. J. J. Campbell is Superintendent and Manager and H. P. Ball, of Ann Arbor, Mich., is President of the Company.

THE Corporation Commission of Virginia has authorized an increase in the capital stock of the Norfolk County Gas Company from $25,000 to $100,000, and the Company expects soon to begin construction. The stock of the corporation is now being offered for sale and is being liberally subscribed for. Owners of property in the Tanner's Creek District, Willoughby Beach, Ocean View and Lenox have expressed delight at this prospective gas plant, and before launching the enterprise, those interested made a partial canvas of these districts and have succeeded in getting more then 500 names as consumers. This is evidence that gas is needed in that county.

THE Galesbnrg (Ills.) Railway, Light and Power Company has provided its consumers' meters with linen tags containing space for the registration of the readings of the meter each month, for 2 years' time. By this registration the consumer will be able to check the reading each month with what has been recorded the previous months, and at any time after the employe of the company has read the meter the consumer can ascertain just what amount has been placed in the company records, and if this does not correspond with what the meter tag shows, he can obtain an adjustment. The plan is one to put the consumers in closer touch with the company and give them some data on past bills.

THE Palatka (Fla.) Gas Light and Fuel Company has been sold to the Solomon-Norcross Company, of Atlanta, Ga., the preliminaries of the transfers of the plant being completed a few days ago. This company is extensively interested in electric light and power works in the South, and upon acquiring the Palatka property immediately proposes to get things in shape to give modern, first-class service.

THE Salem (Mass.) Gas Light Company has its service back to normal conditions. Every person who wants gas for heat or light is connected up, and all the broken or burned off outlets have been closed up, and gas has been turned into the mains at normal pressure. The company is now arranging for pipe, stoves, lamps and other equipment that will be necessary in the rebuilding of the burned city.

THE Bristol County Gas and Electric Company is having a gas holder erected at its plant on North Main street, Warren, R. I. The foundation is already finished and the work on the steel tank has been begun. The demand for illuminating gas being on the increase in Bristol County, causes the outlay at this time. The tank will have a capacity of 75,000 cubic feet and will furnish sufficient gas storage for the community for a good while to come.

A CORRESPONDENT in Rochester, N. Y., writes that the Rochester Railway and Light Company is soon to extend its gas service in Chili avenue in the section recently annexed to the city. An 8 inch main will be laid a distance of about 3,000 feet nearly to the barge canal crossing in that thoroughfare. The Company is also laying a main east from White City to Windsor Beach, a distance of about one-half mile, for the benefit of the cottage section along the lake front at that point. Work on the extension in Dewey avenue to a point about 2 miles north of Barnard's crossing is practically completed. An 8 inch main has been laid, which will be extended as the need arises.

THE Brockton (Mass.) Gas Light Company has offered to the city, through Mayor Howard, the use of the Lawrence street ball grounds which have been known for years as the "bog." For the past year or more the grounds have been closed to ball players because of the erection of new buildings. The Mayor appreciates the offer, and has directed Inspector of Buildings Howard L. Gibbs to arrange for fixing over the diamond and the work will be started immediately.

NINETY THOUSAND DOLLARS is being expended by the Pacific Gas & Electric Company in the construction of a new and larger distributing system to cover the section of Berkeley, Cal., south of Bancroft way and east of Shattuck avenue. The work will provide a new 24 inch main in Adelaide street, reducing to a 20-inch pipe in Shattuck avenue as far north as Haste street. This will be supplied from the high pressure pipe coming out Grove street from Oakland.

THE City Gas Department of Hamilton, O., is adopting commercial methods and has decided to turn off the gas from all consumers who owe long standing accounts.

PAPERS in a suit for libel brought by the Dover, Rockaway and Port Oram (N. J.) Gas Company, against Reuben Farr, have been served recently, in Newark, on Mr. Farr, from whom the company seeks to recover $10,000 damages. The papers in the suit were filed at the Essex County Court House, in Newark, and recite that June 8 at a hearing held by the Dover Town Council, Mr. Farr made statements attacking the company.

GROUND has been broken for the Rocky Mount (N. C.) municipal gas plant. The first work was by the construction force from the railroad, who are laying the spur track into the property, preparatory to an unloading of the machinery and supplies for the plant. The city has received advice of the shipping of a part of the order for pipe, and this will in all probability be unloaded on this site, as it is now the plan to lay the larger mains first.

## Utilities Commission News.

COAST GAS COMPANY EXTENSIONS.—Granting of permission by the New Jersey Board of Public Utility Commissioners to the Coast Gas Company of Belmar to issue $134,000 of bonds insures the extension of the company's mains to Sea Girt, Villa Park, the Bay Head section and West Belmar; the enlarging of the service in shore communities already served by the company and the improvement to the machinery and works.

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CENTRAL INDIANA BONDS AUTHORIZED.—The Public Service Commission of Indiana has authorized the Central Indiana Gas Company, having plants at Marion, Muncie, Anderson and other towns, to issue $250,000 in bonds to pay for 80 per cent. of the cost of construction work which was first paid with a temporary loan. The Commission also authorized the Merchant Heat and Light Company to issue $250,000 worth of bonds to redeem certain outstanding bonds.

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PRICE IN 30TH WARD, NEW YORK CITY.—Public Service Commissioner Milo R. Maltbie has announced that the Kings County Lighting Company has voluntarily agreed to reduce the price of gas in the 30th Ward from $1 to 95 cents, on the condition that the case now being conducted against it by the Commission be allowed to stand for a year.

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ILLINOIS COMMISSION RULES.—The State Public Utilities Commission of Illinois, has issued rules of practice and procedure, with forms, governing matters before the Commission. Among other things it is provided that the Commission, or any commissioner or officer of the Commission designated by the Commission, shall have power to hold investigations. It is provided that the technical rules of evidence need not be followed in such hearings, and that no informality in any proceeding shall invalidate any order, decision or regulation made, approved or confirmed by the Commission. All hearings shall be open to the public.

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REPLACEMENT COST AN UNCERTAIN STANDARD.—Replacement cost as a guide in determining the fair value of a utility property devoted to public use is an uncertain standard, declares the New Brunswick (Canada) Board of Commissioners of Public Utilities, in dismissing the application of the Eastern Electric and Development Company Ltd., for approval of a new schedule of rates. "We are by no means satisfied with replacement cost as a trustworthy guide. It is a difficult standard to apply, even when there has been no marked difference in construction cost, between the time or times when the plant was installed and the time when the estimate of replacement cost is made. Before the advance in cost of labor and materials, replacement cost was usually less than the actual cost of building up a plant, principally because it would be cheaper to install a complete equipment under one contract than to build it up piecemeal, and then it was common for consumers and the public generally to insist that the replacement cost was the only proper basis for rate making; but in many cases this would work manifest injustice to those public utilities which had expended their money prudently and wisely and as occasion required to meet all reasonable calls for service, thereby necessarily expending more than if they had put in the whole equipment at once. We think that if that standard had been rigidly followed, it would have driven public utility corporations to erect plants far in advance of their requirements and to have invested large amounts of capital in plants which must have lain idle and deteriorated without being in a position to earn money. The public would certainly have objected to rates which would have enabled a company to earn a reasonable return upon such premature development, so that either way the public utility company would have been likely to suffer an injustice. But now conditions are changed; owing to the greatly increased construction cost, the replacement value, instead of being less, is more than the amounts actually expended in establishing plants (except, of course, those built up very recently), and now the public utility companies insist that the present replacement cost, with a reasonable allowance for depreciation, should be the basis upon which rates should be fixed, while consumers object. In our view, replacement cost as a standard is not only a difficult one to apply, but owing to the fluctuations in cost referred to, it is an uncertain standard."

## Financial Notes.

IN an endeavor to materialize a plan that would link other gas interests with Columbus and Springfield, representatives of the Ohio Cities' Company, are making overtures to the stockholders of the Dayton Gas Company for the acquisition of the stock and assets of their corporation. Holders of preferred stock are being offered 90, while 70 is offered for common. Last sales being at 65. When the Ohio Cities Company was launched a few months ago it consolidated the gas interests of Columbus and Springfield, and the intimation was strong that the new corporation would endeavor to extend by absorbing the gas companies of other cities. Control of the supply line affording the Dayton natural gas supply is also sought.

THE Newport News and Hampton (Va.) Railway, Gas and Electric Company has applied for an amendment of its charter in order to decrease its capital stock from $2,500,000 to $2,375,000.

THE Pacific Gas and Electric Company reports earnings as follows:

| | | Increase. |
|---|---|---|
| Month of May, 1914. | | |
| Gross | $1,368,891 | $58,127 |
| Net | 646,126 | 94,654 |
| Five months ending May 31, 1914. | | |
| Gross | $7,208,552 | $412,463 |
| Net | 3,453,356 | 559,827 |
| Twelve months ending May 31, 1914. | | |
| Gross | $16,614,800 | $1,311,640 |
| Net | 3,453,326 | 559,827 |

On May 31, 1914, the Company was serving 356,569 consumers, a gain of 30,196 in 12 months. During the first 5 months of 1914, the the gain in the number of consumers was about 2,000 greater than in the first 5 months of the preceding year.

THE American Gas and Electric Company has recently authorized a new issue of 6 per cent. debenture bonds to the amount of $1,000,000. The bonds are to take care of new purchases, construction, etc. The company shows net earnings equal to more than 12 times the annual interest charges on these bonds. The securities are followed by a substantial equity represented by preferred and common stock with a market value of $7,800,000. The bonds are being offered by H. L. Nason & Co., at a price to yield 6.20 per cent.

A. B. LEACH & Co. have purchased and resold at 99½ and interest, yielding 6.20 per cent., $500,000 Lincoln Gas and Electric Light Company 6 per cent. notes, maturing July 1, 1917. These notes are secured by an absolute first mortgage through deposit of collateral upon the entire gas property owned by the Company in Lincoln, Neb., and are further secured by a deposit of $400,000 Lincoln Gas and Electric Light Company first and consolidated 5 per cent gold bonds.

A CERTIFICATE of incorporation was filed in the office of the Secretary of State by the New Jersey Consolidated Gas Company, with offices in Camden, decreasing its capital stock from $10,000,000 to $9,000,000.

EARNINGS report of the Standard Gas and Electric Company, a Delaware corporation, which controls many Western public service corporations, for the year ended March 31, 1914, shows gross available revenue of $1,944,507, and after deducting operating expenses there remained net revenue amounting to $1,902,419. Annual interest on the company's outstanding 6 per cent. sinking fund bonds and collateral trust notes totaled $760,170, and balances for the year was $1,142,249. The company owns stock, bonds and other securities of other utility companies, serving over 200 cities and towns with a total population of approximately 1,656,000.

THE directors of the Newton & Watertown (Mass.) Gas Light Company have declared the regular quarterly dividend of 2 per cent. This is a total of 9 per cent. for the fiscal year ended June 30. The dividends for the two previous years amounted to 11 per cent. annually.

RUMORS are that Peoples Gas (Chicago) is being accumulated on the ground that some day the general expectation of a complete merger of the electric light and gas interests—otherwise the Commonwealth Edison and the Peoples companies—will be met. It should not be difficult to make one company of the two, since control of both is now mutual. A physical consolidation also should prove advantageous. If the Public Utilities Commission acquiesce—it is understood the Commissioners are not opposed to a unification—the deal may be put through in a relatively short time. Anticipation of the consummation explains the recent careful acquisition of the shares.